Stress Placement in Arabic : Theory and Application

2013

بسم الله الرحمن الرحيم

جامعة اليرموك

كلية الآداب

قسم اللغة العربية

النبر في العربية بين النظرية والتطبيق

Stress Placement in Arabic : Theory and Application

إعداد

لؤي عمر بدران

قُدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الدكتوراه في اللغة العربية ، تخصص لغة ونحو في جامعة اليرموك ، إربد ، الأردن .

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1/أيار/2013

(CIEE)

ƨ ƥǋǲǁǁ ǀ ƒĭǋǰƟǅǁǁ

ƱǋƮǋǅǁǁ ƕƟƾƬǁǁ

(praat)

Stress Placement in Arabic: Theory and Application

By

Loay Omar Badran

Supervisor

Dr.Mohammad Saraireh and Professor. Ali Alhamad

<u>Abstract</u>

This study is entitled: (Stress placement in Arabic: theory and application). The researcher aims through this study to detect the characteristics of accentuation and its role in the Arabic language, by showing its features in the stem verb, and derivative stem of the verb by using (Praat) Program.

In order to achieve his objectives, the researcher followed the experimental applied approach by determining the meters of the stem and derivative verbs in the Arabic language, and classifying them in similar groups classified separately based on audio features, then conducting tests within each similar group.

These verbs are studied out of the context, so as not to lose any of its independence when overlapping with other variables such as pausing, and junction.

The thesis includes an introduction, three chapters and a conclusion. The introduction discusses the problem of the study, its importance, its methodology, and previous studies. The first chapter is entitled: (Accentuation in Arabic language: discussion and analysis). This chapter discusses the meaning of accentuation in the past and in the present times , how the meaning evolved from its limited meaning to (HAMZA) in the past, to the inclusion of four elements to shape its form : lengthening , stress , frequency, and audio clarity. Then, the researcher elaborates on the relation between audio clarity and accentuation, and the reasons prompted phoneticians to divide accentuation into four sections. Then he discusses the relative accentuation, as all syllables are accentuated. No syllable is preferred over other syllables, the variation in meaning based on the variation of the accentuation, and how the scholars had two views on this issue.

Then he discussed the views of the five most prominent phoneticians in the Arabic language , namely : Ibrahim Anis , Tamam Hassan , Dawood Abdoh , Ahmad Mukhtar Omar , and Moahmmad Ali Khouli . The researcher proves that the rules and the grammars that they selected did not cover all the sorts of Arabic discourse.

The second chapter, entitled (Accentuation of Stem Verb),where the researcher clarifies the degrees of accentuation found in each of the stem verbs including the correct verb form(Sahih Salim) , the verb whose initial includes a glottal stop , the verb where the glottal stop appears on the second letter , the verb where the glottal stop appears at the end, the stressed verb (Mudaaf) , (Mu'tal Mithal Verb) , (Mu'tal Hollow Verb) , (Mu'tal Imperfect Verb) (Mu'tal Lafif Maqron Verb) and (stem quartet verb)

The third chapter is entitled (Accentuation of Derivative Verb). In this chapter, the researcher clarified the degrees of accentuation found in each type of the derivative verbs, including the verb derived with one letter, two letters, and three letters, and the derivative quartet verb.

ƦǊǂǏƥ ƕǴƗǀǁƐ ƕǓƗǊƬǁƐ ƕǂǎƣǀƚƨǂǁƐ Ǐƺ ƕǁƑƨƥǁƐ .

C	Ʊ	'	ƅ
ġ	Ƶ	b	ƒ
f	Ƹ	t	Ɩ
q	Ƽ	ṭ	Ƙ
k	ƿ	ğ	Ɨ
l	ü	ḥ	Ɲ
m	!	x	Ơ
n	ǅ	d	ƣ
h	ølj	ḏ	Ƥ
w	ǋ	r	ƥ
y	ă	z	Ʀ
a	ƕƟƗƺ	s	Ƨ
u	ƕǅƮ	ŝ	Ʃ
i	ƴƥƨǀ	ş	ƫ
ā	ƕǂǏǊƯǁƐ ƕƟƗƻǁƐ	ḍ	ƭ
ū	ƕǂǏǊƯǁƐ ƕǅƮǁƐ	ṯ	Ư
ī	ƕǂǏǊƯǁƐ ƴƥƨǀǁƐ	ẓ	ư

huDŽɋʂDŽǁƐ

* (pratt)

(1) 1979 . 170

(1)

2008، 485.

(1) ... 15 ... 2007 ... 186 ... 187 .

[illegible]

[illegible] [1] [illegible]

[illegible]

[illegible] [2]

[illegible] :

[illegible] :

- [illegible] .
- [illegible]
- [illegible] .
- [illegible] .

[illegible] (praat) [illegible]

[illegible]

(1) [illegible] 4 [illegible] 2006 [illegible] 223

(2) [illegible] 13 [illegible] 4 [illegible] 1997 [illegible] 256

2007

2009

(247)

σĭNJDŽƗǁɛ

(1) ... 1 ... 1998 ... 240 .

(1) ... 1966 ... 1 ...

17 ...

(2) ... 17 ...

(3) ... 1 ... 1966 ... 194 .

[illegible] (1)." [illegible] .(Decibel) [illegible] :

[illegible]	DECIBEL
[illegible]	Zero
[illegible]	010
[illegible]	020
[illegible]	030
[illegible]	040
[illegible]	050
[illegible]	060
[illegible]	070

(1) [illegible] 240 .

[illegible]	080
[illegible]	090
[illegible]	100
[illegible]	110
[illegible]	120
[illegible]	130
[illegible]	140
[illegible]	175

(1)

[illegible] [2]." [illegible] 70-60 [illegible] 150-100 [illegible] 300-200 [illegible] 400-300

(1) [illegible] 54 [illegible] 55 .

(2) [illegible] 240 .

ƘƒĂƮǕǴǂ ǂŏǈǴǠ!ƒ / ǀƧĂƥ 1300-1200 ǴƵǴƽƙƧƒ ƘƒĂƮǕƒ Ƨƛǂǅ ƩǐǊŏĂ ǕǂŏǈǴǠ!ƒ / ǀƧĂƥ

ƴƿǌǊ ǋǂƧƥƙĂ ƘĂƮ!ƒ ƨƧƽƙ ǇǅǴǌǇǂǆŏ ǂŏƧƬǊ!ƒ ǇǋǕƒ ǇǅǂŏǆǐƺǊ!ƒ ƔƧǴƞƙ!ƒ ƘƙǊƛǅĂ Ǖ ǂŏǀŏƪĂǆ!ƒ

ǇǂǆŏƥƥƧƙ ǏǐƵǅ ǇǅĂ Ǖ (Hirtz) ǂŏǈǴǠ!ƒ / ǀƧĂƥ 20-16 Ŏ!ƒĂơ Ǐ!ǫ ƴƮŏ ǂŏơ Ǖ ǇǂǆǆƥƥƧƙ

.[1] ".ǂŏǈǴǠ!ƒ / ǀƧĂƥ 20000 Ǐ!ǫ ƴƮŏ ǉƨŏǆƙĂ ǋƺǆƪƙ ǇǅǇǕ!

Ŏǅ ǴǌƵǴǆƙƞƒ ƔǐƺŏǋǬ Ǖ ǂǆǐǂ!ƒ Ŏǅ ƧǊǈ!ƒ ǂƒƥơǫ ǇƵ ǂ!ĂƋƪǆ ƥƺƙ ǂƛǗƛ!ƒ ƴǆƒĂƺ!ƒ ǉǋǌǅ

Ŏǅ ǂƺǆƙƞǆ ǂƛǗƛ!ƒ ƴǆƒĂƺ!ƒ ǁƧƙƬƙ ǇǴŏơǕƒ ƔǐƩǅ Ŏǅ" Ʃŏǐǌ!ƒ ƻƪĂŏ ƴĂǀŏ Ǖ ƧĂǊǉǆ!ƒ ƴƱǀǆ!ƒ

[2] . "ƴƱǴǀǆ!ƒ ǇǆǉƧŏƩ ǏǐƵ ǉƨƒƧǊǫĂ ƧĂǊǉǆ!ƒ ƴƱǀǆ!ƒ ƧǴǌǕǫ

ǏĂǀƙ ǇǌǊ ƴƱǴǀǆ!ƒ ǇǆǍ ƴƱǀǆ ƳǴǊƬǫ Ŏǋ ǀƧǊǉ!ƒ Ǉǫ ƴǴǫ ǏǋĂ!ƒ(ĂǉŏƙǉǴǂ) ǏǅƧ Ǐ!ǫ ǀƥĂƺ!ǴǊĂ

Ƨŏƹ ƧǊǉ!ƒ ǇǅǍ ƥǂƋŏ ĂǌǅǕ ǂǂƧƙƬǆ ƧƮǴǉƵ ǀƥƵ Ăǅ Ǖ ǉƒƥǆ Ăǅ ǋƙƥƬ Ăǅ ŎǀŏƪĂǆ!ƒ ǋƵǴƽƙƧƒ Ǵǆǫ

ǂƛǗƛ Ăǅ ǇǗǆǴƵ ƴǆƙƞŏ ƥǀǅ ƧĂǊǉǆ!ƒ ƘĂƮ!ƒ Ơǆǘǆ ƴŏǂƬƙ ƴǆƒĂƵ ǇǆǍ ƥơƒĂ ƴǆǴƵ ǏǐƵ ƧƮƙǀǆ

. ǋƙŏƋƧ ƥŏƥơƙ Ŏǅ

ǂǆƛ ǇǅǕǫ Ǖ ƥƥƧƙ!ƒĂ ǀƥƬ!ƒĂ ǀƥǆ!ƒ ǋŏǅ ƴǆƙƞŏ ǇǅƥǊǕ ƧǊǉ!ƒ ǇǅǇƵ ǂơǴǊ Ƨŏƹ ƧǐƵ ƥǀ!Ă

ƧĂƥ ǋ!! ƧŏƤǕƒ ƒǋǌǅ Ǖ Ŏƺǆƪ!ƒ ƟĂưĂ!ƒ ĂǋǉĂ Ǖ ǂƛǗƛ!ƒ ƴǆƒĂƺ!ƒ ǉǋǋ ƴǆ ǋƞƒƧƥǫ ǇǂǆŏƧƤƈ ǗǆǴƵ

ǆǗǂ Ǐ!ǫ ƴǆƙƪǉ ǴǆƥǉƵ Ǵǉǫ" : ƒĂƮƤ!ƒ ƒǋǌǊ ǇƒƧƺƪ!ƒ ƴĂǀŏ Ǖ ǴŏƺǆƪƧǊǉ!ƒ ƟĂưĂ ǀƥǴŏƨ Ŏǅ

Ǉǆ ƒƨĂƧǊ ƥƬǅ ǇĂǂŏ ƘǴǆǐǂ!ƒ Ăǅ ƴƱǴǀǆ!ƒ Ǉǆ ƒƥƥƵ Ǉǅ ǁƧƥǉ ǇơǉǅƘǴƷǐ!ƒ Ǉǆ ǂƷ! Ǐǅ Ŏǅ ƴƮƙǆ

. ǂǐǆƞ!ƒ ƧƑǴƪ

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(1) ƧƥǴǀ!ƒƥǊƵ Ǖ ƴŏǐƞ!ƒ Ǖ ƘƒĂƮǕƒ ǂŏĂƷǐ!ƒ Ǖ ƒ 51 ǉ 52 .

(2) Ʃŏǐǌ!ƒ ǕƪĂŏǕ ƧǊǉ!ƒ Ŏǅ ǂƷǐ!ƒ ǂŏǋƧƺ!ƒ ǂǐƞǆ!ƒ ǂŏǋƧƺ!ƒ ƘǴƪƒƧƥǐ! ƘǴƪƒƧǀ!ƒǕǂŏĂƷǐ!ƒǕ ǋǆ ǇǆƊ 3 Ǖ Y 2 Ǖ ƒ 95.

(1) .188

(2) . 241

(1) ... 1966 ... 27

(2) ... 241 .

(3) ... 1986 ... 426 .

(1) [illegible] 1963 [illegible] 134 [illegible] 135.

(2) [illegible] 1 [illegible] 2003 [illegible] 169.

[illegible] [1]

[illegible] [2]

[illegible]

(1) [illegible] 239 .

(2) [illegible] 2005 [illegible] 233 .

[illegible] (1) [illegible] (2) [illegible]

[illegible]

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(1) [illegible]

.247 f [illegible]1966

(2) [illegible] f 101

(fa sa ya ta dā wa lā ni hi mā)

: Ănj5 ǏǉþǕƒ Ǐ!ǫ ǏǃƵǕƒ ǈǆ ƔƒĂƙ!ƒ þƅƵ ǈǴƜǆƧ þǉƵ ǉþĂƧĂ ƔƪơǑƶǆƪ!ƒ ƟĂƜĂ!ƒ ǅƪ ǴǆǄ "

1. ƚǆƤ5ǆ!ƒ ƚơƙ5!Ǵƚ ƚƶƪƙǆ!ƒ ƘǴƚƧơ!ƒ .

2. ǀƧƪƚ!ƒĂ ƚǆƜ!ƒ Ǉ ƚ!ǒƜ!ƒ ƘǴƚƧơ!ƒ .

3. ǅǘ!ƒĂ ǇƒƧ!ƒ : ƚǒǉǴƞ!ƒĂ ƚǒƧƒƧƚƙ!ƒ ƘƒĂƮǕƒ .

4. ǈĂǉ!ƒĂ ǅǒǆ!ƒ : ƚǒ5ǉǕƒ ƘƒĂƮǕƒ .

5. ǅǒƞ!ƒ : ƜĂþƨǆ!ƒ ƘĂƮ!ƒ .

6. Þ ĭƒƨ!ƒĂ ýƒƦ!ƒĂ ǇǄ!ƒ : ƚǒƚǴƚƙơǗƒ ƘƒĂƮǕƒ

7. ýƒþ!ƒĂ ǇǄ!ƒ : ƚǒƧǴƞ5ǉǗƒ ƘƒĂƮǕƒ .

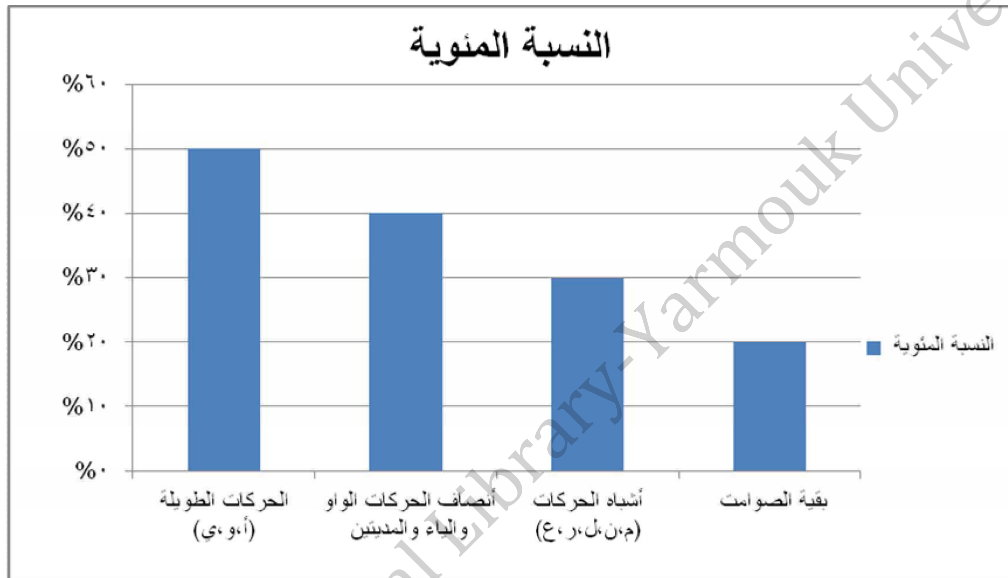
8. tch ţ ƙ : ƜĂþƨǆ!ƒ ƘĂƮ!ƒ

9. ǇǄ5!ƒĂ ǈǒƪ!ƒĂ ǈǒƬ!ƒ : ƚǒƚǴƚƙơǗƒ ƘƒĂƮǕƒ .

[1] " ƇƠƽ!ƒĂ ǈĵŏʅ!ƒĂ ƇƠƙ!ƒ : ƗŏƧƠƞǉǛƒ ƘƒĂƮǛƒ. 10

.[2] ƘƒƇƠǈƙʅƒ ǈĵǆ ĂǆƤ Ǜ ƘƠǆ!ƒĂƙǆ!ƒ ǉƦǋ ǈĵ Ǜǫ ƖƧƠƮǛƒ ǈĵǆ ƥƞ ǛĂ

: ŎƶǆʅĿ ƟĂưĂ!ƒ ƘƠƞƧƥ! ƗŏĂƑǆ!ƒ ƔʅǉĿƒ ǈĵŏǉŏ ýǂƮ!ƒ ƒƦǋĂ



(3)

Ŏ5 ƠơĂưĂ ŷpǛƒ ƻƧơǛƒ ýǚP ǈĵǆ ƧǉǉĿƒ ǆǒǉƶƙǉ (ƥƧĂƼƠǂ) ƠƮǉ ƔŏƧƙ!ƒ ƒƦǋ ĬǉƵ ƇƠǉǉĂ

[4]ýǆʅ!ƒ

---

(1) ƶǉ Ƨƥƙ!ƒ ƶǉ Ü ýŏǉƞ!ƒ Ü ƘƒĂƮǛƒ Ü ƗŏĂƺ!ƒ ƒ 137 .

(2) ƟĂǉƮǆ Ü ƥƶʅ Ü ƗʅƒƧƥ ýǆʅ!ƒĂ ǆǚǂ!ƒĂ Ü ƒ 232 .

(3) ƶǉ Ƨƥƙ!ƒƶǉ Ü ýŏǉƞ!ƒ Ü ƘƒĂƮǛƒ Ü ƗŏĂƺ!ƒ ƒ 54 Ĳ 55 .

(4) Catford .j. 1994 A Paractical Introduction to Phonetics.Oxford University Press:United States .p 173

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(1)

*

1983 134 .

(1) 1990 160 .

(yar ḍā [illegible])   (fa ri ḥa [illegible])

[illegible] (Θ f + Θ f + Θ f) [illegible]

[illegible] (Θ Θ f + f Θ f) [illegible]

[illegible]

[illegible] ([illegible]) [illegible]

[illegible]

[illegible] [1]"[illegible]

[illegible]

109 f [illegible] 2000 [illegible] 1 [illegible] (1)

(1) ... 2005 ... 51

: ǑƙŬƓǂ ŬƓďžƙơƒ ƧTƵ ƚƙƪ ǑƝǌ ǇǆŏƶƱƖďž Ǉďž ƚǉĂǂďž ƚďžǚǂ ǇƵ ƋTǉƙ Ǒƙ!ƒ ƘŬƓďžƙơŬƓƼ

ƚŏĂƿ ýďžƒĂƵ ǇĂƥ	ƟĂ ư Ă / ƚηƧƥ / ƖƥT / ýĂƱ	1
ƟĂ ư Ă	/ ƚηƧƥ / ƖƥT / ýĂƱ	2
ƚηƧƥ	ƟĂ ư Ă / ƖƥT / ýĂƱ	3
ƖƥT	ƟĂ ư Ă / ƚηƧƥ / ýĂƱ	4
ýĂƱ	ƟĂ ư Ă / ƚηƧƥ / ƖƥT	5
ƟĂ ư Ă / ƚηƧƥ	ƖƥT / ýĂƱ	6
ƚηƧƥ / ƖƥT	ƟĂ ư Ă / ýĂƱ	7
ƟĂ ư Ă / ƖƥT	ƚηƧƥ / ýĂƱ	8
ƚηƧƥ / ýĂƱ	ƟĂ ư Ă / ƖƥT	9
ƟĂ ư Ă / ýĂƱ	ƚηƧƥ / ƖƥT	10
ƖƥT / ýĂƱ	ƚηƧƥ / ƟĂ ư Ă	11
ƟĂ ư Ă / ƖƥT / ƚηƧƥ	ýĂƱ	12
ƟĂ ư Ă / ƚηƧƥ / ýĂƱ	ƖƥT	13
ƟĂ ư Ă / ƖƥT / ýĂƱ	ƚηƧƥ	14
ƚηƧƥ / ƖƥT / ýĂƱ	ƟĂ ư Ă	15
ƟĂ ư Ă / ƚηƧƥ / ƖƥT / ýĂƱ	ƚŏĂƿ ýďžƒĂƵ ǇĂƥ	16

ǴnjŀŀĐ ǴdžǂÜ ƧĂǶŀjdž!ƒ ĂNj ǑŀjǴλ!ƒ ĂĐ Ǵnjö5 ýĂǕƒ yƱǀdž!ƒ LJĂǂŏ LJĐ ýdžķơķ Ü LJŏƶƱǀdž!ƒ ƘƒŖ ƚdžǂ!Ǵ5

Ü ƚλǘλ ĂĐ ýdžƒĂƵ ƚƶǶƧĐ YǴdžķƞǴ ƧǶƒj þp LJĂǂŏ LJĐ ƒƧĂǶŀjdž ýĂǕƒ ǴnjƶƱǀdž LJĂǂ ƚ!Ǵơ Ǒ5 ýdžķơķ

ƚķƪ ýþǴǶķ!ƒ ƒŖNj LJdž ǆTŀjŏĂ Ü ƧƒĂþǕƒ LJǴƶƱǀdž!ƒ ýþǴǶķŏ ƒŖǂNjĂ Ü ǑŀjǴλ!ƒ yƱǀdž!ƒ LJƵ ǴnjǶǴŏƩ ýǶǴǀdž

. ǕǴdžķơƒ ƧTƵ

ljŖnj! ƚƶưǴP Ǒnj5 Ü yƱǴǀdž ǀƧTƵ Ǐ!ǫ þơƒĂ yƱǀdž LJdž ǴnjƶƱǴǀdž LJĂǂķķ Ǒķ!ƒ ƘǴdžǂ!ƒ ƚŏǀǶ ǴdžĐ

: ǑķǕƒ Ăơŀj!ƒ ǏƵ ƘǕǴdžķơǕƒ

ƘǕǴdžķơƒ 4 þơƒĂ!ƒ yƱǀdž!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 16= 4 Ã 4 LJŏƶƱǀdž!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 64 = 4Ã4Ã4 yƱǴǀdž!ƒ ƚλǘλ!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 256 = 4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚƶǶƧǕƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 1024 = 4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚƪdžP!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 4096 = 4Ã4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚùķƪù!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 16384 = 4Ã4Ã4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚƶǶƪ!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 65536 = 4Ã4Ã4Ã4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚŏŀjǴdžλ!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 262144 = 4Ã4Ã4Ã4Ã4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ƚƶƪķ!ƒ ƘƒŖ ƚdžǂ!ƒ

ǕǴdžķơƒ 1048576 =4Ã4Ã4Ã4Ã4Ã4Ã4Ã4Ã4Ã4 yƱǴǀdž!ƒ ǀƧTƶ!ƒ ƘƒŖ ƚdžǂ!ƒ

[illegible] [1] [illegible] [2] [illegible] [3] [illegible] [4]

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(1) [illegible] 358

(2) [illegible] 163 [illegible] 164

(3) [illegible] 2010 [illegible] 161.

(4) [illegible] 28 - 32 .

ýĂÜƒ ý Ʈ5!ƒ

Ĭ Ljƶdž!ƒĂ ƨĜŏ ʅ!ƒĂ ƧhLj!ƒ

(1) ... 166

[1] (1) (392) ... 2001 ... 3 / 123

(2) ... 129

(3) ... 1993 ... 1 ... 192

[illegible] [1]

[illegible] [2]

[illegible]

[illegible] [3]

(1) [illegible] 2003 [illegible] 159

(2) [illegible] 1969 [illegible] 263

(3) [illegible] 2001 [illegible] 397

(1) [illegible] 164 - 165 .

ĿŏƨōǁƞǀǗƒ Ŀƺǁ!ƒ ýǴơ ĂǸ ǴǆŧƧƤčĂ ǏǀƶǆǈLJŏǈ ѣƧƺŏ ǊǀǕ ǻǆŏǀĂ5 ƘǴƺǁ!ƒ Ưƶǈ Ŏ5 ƧǈǀƜƒ þƶŏĂ

Ŀǆǁŧ!ƒ LJǆ ŎǀǴǉ!ƒ ýƱǀǆ!ƒ ƧǈǀĂ ǴǌǀǆýĂǕƒ ýƱǀǆ!ƒ ƧǈǀŏLJŏơ Ǵǆʅƒ þƶǩ Ŏǩ!ƒ (Import) Ŀǆǁŧ5

ýƶƞŏ þƥĂ (convert-permit-subject-contract)ǴǌǁǉǆĂ Ŀŏǁƶ5!ƒ Ǐ!ǫ ĿŏǆʅǛ! ĿƥƧǴ5ǆ ǴǌǁƶƞŏŸ

Ŀǆǁŧ5 Ŀŏ5ƧƮ ĿǌƞĂ LJǆ ǊǩƥƧǴ5ǆŧ Ŀŏ!Ǚþ ĿǌƞĂ LJǆ ǴƥƧǴ5ǆ Ŀǆǁŧ!ƒ Ŏ5 Ŏ!Ǚþ!ƒ ǏǀƶǆƜ!ƒ Ƨǈǀ!ƒ

ýƱǀǆ!ƒ Ŏ5 ǛƮơǩǆ ƧǈǀƜƒ LJǴŧ ƒƦǁǆ Ƶ ǏǁƵ ĂǁƔč ƧǌƮ ƻĂƧƶǆ!ƒ ƧǌƮ!ƒ ǏǁƵ ýþǩ (Augst)

Ɣŏǌǆ) ĿƼƮ ǏǁƵ Ǖƒþ ǏǀƶǆƜ!ƒ LJĂŧŏ5 (Augst) ǴǌǀǆŎǀǴǉ!ƒ ýƱǀǆ!ƒ ǏǁƵ Ƨǈǀ!ƒ YĂƥĂ ǴǆǄýĂǕƒ

.[1] (ýŏǁƞĂ

LJĂŧŏ ýƵǴ5!ƒ ĿƺŏƮ5 Ŀŏ5ƧƮ!ƒ ĿƺŏƮ!ƒ ƻƒǴƲĂ LJǆ ĿŏǈƧƶ!ƒ Ŏ5 ǄǛŧ!ƒ Ƨǈǀ LJǄ LJǴʅơ ǄǴǆǩ ăƨŏĂ

ǴǆǄ ǇǴǩ!ƒ ǏǁƵ ýƶ5ǩʅǆ ĿƺŏƮĂ LJŏƶ!ƒ ǏǁƵ ƧǈǀƜƒ LJĂŧŏ ýĂƶ5ǆ!ƒ ĿƺŏƮĂ ǇǴƺ!ǫ ǏǁƵ ǻƶ5ƒĂ Ǵǌŏ5 ƧǈǀƜƒ

ƻƒǴƲĂ ƒƦ LJĂŧŏ ǊǀǕ Ŀŏ5ƧƮ!ƒ ƸŏƮ!ǴǈĿƥǛƵ Ǌ! ƩŏǁƼ Ŀŏǆǜŧ!ƒ ƘǴƵĂǆƞǆ!ƒĂ ýǆƞ!ƒ Ƨǈǀ

.[2]ĿŏĂơǀ

ýƶƞǩ LJǄ ĂǸĂ YǴǈǩǕƒ Ăƒ ǀƒƦǴơǆ!Ǵǈ LJĂŏĂƺǁ!ƒ ǀǴǆʅ Ǵǆ ĿŏǈƧƶ!ƒ ǀƧǴǈƶǁ! ĿŏưĂƧƶ!ƒ ƘǴŏĂǩʅǆ!ƒ LJǆŏĂ

(189-188 ƒ ǏĂƺǁ!ƒ ƘĂƮ!ƒ ĿʅƒƧþ Ǖ þǆŏơǄ Ǖ ƧǆƵ ƧǴǩƤǆ (1)

. 165 ƒ Ŀƺǁ!ƒ Ŏ5 Ŀơǈ!ƒ ǊǊǌǴǀǆ Ǖ LJǴʅơ ǄǴǆǩ (2)

[illegible] [1] [illegible]

[illegible] [2] [illegible] [3]

(1) [illegible] 911 [illegible] 2010 [illegible] (414/1.

(2) [illegible] (392) [illegible] 1960 [illegible] (19/1

(3) [illegible] 1965 [illegible] (57/1 -62)

sang

(o) (a) song

Intonation

(1)

(2)

(1) 911 . (16-13 f /1 . 1984

(2) 1990 . f

(1) أنيس ، إبراهيم : الأصوات اللغوية ، ص 174 .

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] (mul) [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

(1) [illegible] 361 .

(2) [illegible] 2003 [illegible] 140

(3) A crosss lJ language study of perception of lexicall stress in English . Vickie y . yu . jean E. andruski . published online : 23 december 2009 p 344

Ĉǚŏ! _ Ĭǃŏ! _2

ǇƵ ǇĜǂ - ţŏƧƥ ǅnjǈǆǅĂ ƔƧƶ!ƒ ǇǆǅŽ ƨǆnjŏ Ŭ ǇǆǅŽ ƥǈƵ - ĜǆnjǈŏƝ ƨŏŏǆǆk!ƒ ǇǅD ƯƧƙƽǉ ǇơǉƼ

: ƒƦǂǋ ƧƕǈǃƒƼ ƽŏƧƱ

[1] ./ ϒ ϒ Σ / Σ ϒ Σ = (Ĉ) ǚŏ! Ü / ϒ ϒ Σ / Σ ϒ Σ = Ĭǃŏ!

ϴ ƒ + ƒ ϴ ƒ) ǇǆǅŽ ǂǆǅǃǂ!ƒ ǇĂǂƙƙ ĜǆǅƥǈƵ ƧǆǅƵ ƧĜƙƤǆǅ ƥǆǅơD ƥǈƵ ƧĂƕǈǆǅ!ƒ ƴƱǀǆǅ!ƒ

ƴƱǀǆǅ!ƒ Ĭ!ǫ Ĭǃŏ! ŎƼ ýĂǕƒ ƴƱǀǆǅ!ƒ ǇǆǅŽ Ƨƕǈ!ƒ ýǀƙǈŏ Ǉŏ!ĜǄǆǅ!ƒ ǇŏƦǋ ŎƼĂ Ü ýĂǕƒ ƴƱǀǆǅ!ƒ Ăǋ Ü(ϴ

ƧĜƙƤǆǅ ƥǈƵ Ǉŏƙǆǅǃǂǃǂƒ Ĝƙǃǂ ŎƼ Ƨƕǈ!ƒ ƴƯĂǆǅ ĈĜǀƝ ǂŏǈĜǂǆǅǫ ǇƵ ĜǆǅD Ü ǀƨĂǆǅnjǆǅ!ƒ Ƨŏƺ Ĉǚŏ! ŎƼ ŎǈĜǄ!ƒ

Ĝƙǃǂ ǇǅD ƠƞƧǆǅ!ƒĂ . ƔƞƒĂ ƧǆǅD ƘĜǆǅǃǂ!ƒ ǇŏƝ ƒƪŏǆǅǆǅ ǋƼƮĂƝ Ƨƕǈ!ƒ ƥĂƞĂ ǇǂǂĂ Ü ƯƧƙƽǆǅ Ƨŏƺ ƧǆǅǆǅƼ

ƽƧĜƼ!ƒ ƒƦǋ ƥĂƞĂƼ Ŏ!Ĝƙ!ĜƝĂ Ü ýƶƽ!ƒ ƒ ƒĜƮƤ ǇƵ ƻǃƙƤƙ ƒ ƒĜƮƤ ǅǆƪǚ!Ă Ü ǅǆƪƒ Ǉŏƙǆǅǃǂǃǂƒ

.ǅǆƪĜơ Ƨŏƺ ƧǆǅD ĭ Ƨƕǈ!ƒ

. (ýƶƼ) ϴƦƀ _ (ǂƼƮ) ϴƦƀ _3

ŎǈĜǄ!ƒ ĬǃƵ ýƶƼ!ƒĂ ÜýĂǕƒ ƴƱǀǆǅ!ƒ ĬǃƵ ǂƼƮ!ƒ Ƨƕǈ ƽŏƧƱ ǇƵ ǇĜǂ ƨŏŏǆǆk!ƒ ǇǅD ƯƧƙƽǉ ǇơǉƼ

:ƒƦǂǋ

./ Σ ϒ Σ / ϒ Σ = ǂƼƮ ϴƧƼ

[2]./ Σ ϒ Σ / ϒ Σ = ýƶƼ ϴƧƼ

---

(1) ƧĜƙƤǆǅ ƧǆǅƵ Ü ƥǆǅơD : ƥƧƒǂƪ ǂƪƮ!ƒ ƘĂƮ!ƒ ĭĂƺǃ!ƒ ƒ 361 .

(2) ƴƞƧǆǅ!ƒ ǉƼƪǋ Ü ƒ 361 .

[illegible]

[illegible] [1]

_4 [illegible]

[illegible]

[illegible] [2]

[illegible]

(1) [illegible] 361 .

(2) [illegible] 1975 [illegible] 167-166 .

Ư ƶƅ (ĭ ƨǒǒďǩ!ƒ Ƨǒƺ YǍǈ!ƒ ǇǇď ǇǇǴǂ ǇǫǍ) Ƨƅǈ!ƒ ƾǒƧƱ ǇƵ Ƨƪƽǈ ǇǇ ǴǈǈǂďǒǴǈǈǇ Ǵďǂ "

: ýƛď ăƧƤ ǂǒƧƱƅ ǤǴďƥǀ!ƒ ǇǍǒǍƷ!ƒ ǴǋƧƪ5 Ǒǩ!ƒ ǂƛďǕƒ

ƧďǕƒǍ . ǈǌ ư ƶƅ ƥǈƵ ǀƧǒƬ ǀ!ƒ ǂơǩƽ!ǴǍ Ü ǈǌ ư ƶƅ ƥǈƵ (ǂǒǍƱ!ƒ ǂơǩƽ!Ǵ) ƥď!Ǵ (Ǵǈ) ƾƱǈ _

Ǒ5 ýǍǕƒ ƴƱǀď!ƒ Ĭ ƵǍ Ü Ĭ!ǍǕƒ ǂ!Ǵơ!ƒ Ǒ5 ǑǈǴƛ!ƒ ƴƱǀď!ƒ Ĭ Ƶ Ƨƅǈ!ƒ ƴ ư Ǎ Ĭ Ƶ ýďơǒ ǇǇ ǇǂďǑ

(1) . ǂǒǈǴƛ!ƒ ǂ!Ǵơ!ƒ

ǍƒǍ!ƒ ƴď ƔƑǴƺ!ƒ ƧǒďưǍ Ƨǒďư!ƒ ƒǬǌ5 Ü Ƨƛǈ!ƒ Ǒ5 Ǖ ƧƶT!ƒ Ǒ5 ƨǒǒďǩ!ƒ ƒǬǌ ǇǍǂǒ Ǵď Ƨƛǂ

ƧǒƬǀǩ Ǒ5 ĭƧƶT!ƒ Ƨơƅ!ƒ ǈǂơǩǒ Ǒǩ!ƒ ƘǴďǈǂ!ƒ ăƥơ Ǒǌ Ü (ǈùù) Ƨǒďư!ƒ ǤǴǋǍ Ü (ǍǌǍ)

Σǒ!Ǎ Ƨƅǈ!ƒ ƧǌǕǋ ĭǬ!ƒ ýǍƱ!ƒ ýďơǩ Ǒǩ!ƒ Ǒǌ Ü ǀƧǴTǕƒ ƘǀƅƩ Ǵďǂ Ü ƻ!ǕƒǍ ǈǩ!ǴƱǫ Ǎǈ ǴǌǀƱǈ

. ǈƥơǍ Ƨƅǈ!ƒ Σǒ!Ǎ (2) "ƾƱǈ!ƒ ƒ ƑǴƬƤ Ǉď ƘǍƬ!ƒ ǀƥď5 " Ü Σǂƶ!ƒ

Ü ǋƔƧ ưǒ ǍǌǍ Ü ƥ!ǴƤ ƒǬǌ Ǎơǈ ƔƧƶ!ƒ Ư ƶƅ ǇƵ ǀǴơǈ!ƒ ǴǋǴǂơ Ǒǩ!ƒ ƥǒƥTǩ!Ǵ ƻpǍ!ƒ ǂ!Ǵơ _Ɣ

(3) . ƧǒƤǕƒ ƴƱǀď!ƒ Ĭ Ƶ Ƨƅǈ!ƒ ƴ ư Ǎ Ĭ Ƶ ýďơǒ ǇǇ ǇǂďǑ ƧďǕƒǍ

---

(1) ƧǴǩƤď ƧďƵ Ü ƥďơǇ : ƥƧƒƪǂ ƘǍƬ!ƒ ǍƺǈƒĬ ƒ 361

(2) The features and training of English stress and rhythm . Nov . 2008 . volume 5 .3NO . 11. p 94

(3) ƧǴǩƤď ƧďƵ Ü ƥďơǇ : ƥƧƒƪǂ ƘǍƬ!ƒ ǍƺǈƒĬ ƒ 361 .

(1) ... 161 - 162

(1) ... 163 – 164 .

: ǑƶƱǀďž!ƒ Ɣǒǂƨƙ!ƒ

Ü ƴƱǴǀďž ǀƨƬƵ Ǐ!ƍ ƥơƒǍ Ǉǒƀ Ǉďž ƴƱǀďž!ƒ ǎǍƙƪďž ǏǀƵ ǂǒƀƨƶ!ƒ ǂďžǀǂǀ! ǂƶƺ!ƒ ǂǒǈƀ ƥƥơƙƙ

: ǂǒ!Ǵƙ!ƒ ƴǴǂƬǕƒ ƾ5Ǎ

(ĉ ƻ) : ƴƱǀďž!ƒ ǂǒƥǴơƊ 1

(Ċƥ Ƶ) : ƴƱǀďž!ƒ ǂǒƑǴǉƛ 2

(Ʃ ƨƥ) : ƴƱǀďž!ƒ ǂǒƛǗƛ 3

(Ɗďžǀƶƙ) : ƴƱǀďž!ƒ ǂǒƵǴƀƨ 4

(ǇǍǀƀǀƙƪǒ) : ƴƱǀďž!ƒ ǂǒƪǴďžƤ 5

(ǴǋǍďžǂďžƨǀǉƊ) : ƴƱǀďž!ƒ ǂǒƪƒƥƪ 6

(Ǵďžǌǉǈďžƪǀǀƙ) : ƴƱǀďž!ƒ ǂǒƵǴƀƪ 7

(Ǵďžǌǉǈďžƪǀǀƙǒ) : ƴƱǀďž!ƒ ǂǒǉǴďžƛ 8

(Ǵďžǂƥǒùƀǈǀƀ5) : ƴƱǀďž!ƒ ǂǒƵǴƪƙ 9

(ǴďžǌǉǕǍƒƥƙǒƪ5) : ƴƱǀďž!ƒ ǂǒƨǴƬƵ 10

ǐƦ!ƒ Ǎǋ ƘǴďžǀǂ!ƒ ǉƦǋ ƴƱǴǀďž ǇǒƀǇďž ƒƥơƒǍ ǴƶƱǀďž ǇǊ Ǐ!ƍ ƔǴǋƦ!ƒ ƻƪƶƙ!ƒ Ǉďž ǇǊ ǍƥƀǒǍ

Ǉďž ǂǉǒƶďž ǂƞƨƥ Ǐ!ƍ ƜǴƙơǒ ƴƱǴǀďž!ƒ ǉƦǋ Ǉďž ƴƱǀďž ƴǂ5 Ü Ǵǌ! ƨǍƥ Ǖ ƴƱǴǀďž!ƒ ǂǒǀƀǍ ǕƨƀǉƒƳďžơǒ

[illegible]

* [illegible] 1 [illegible] 2001 [illegible] 173 [illegible] 175

(1) 362 - 357

(1)

(2)

(3)

(4)

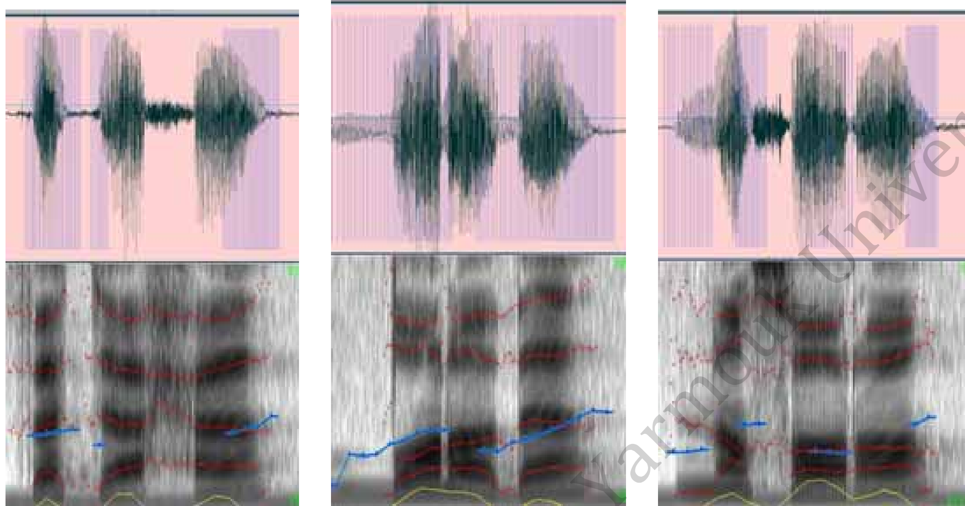
(5)

Ĭ ǆƑƙǁƐ üƬƻǁƐ

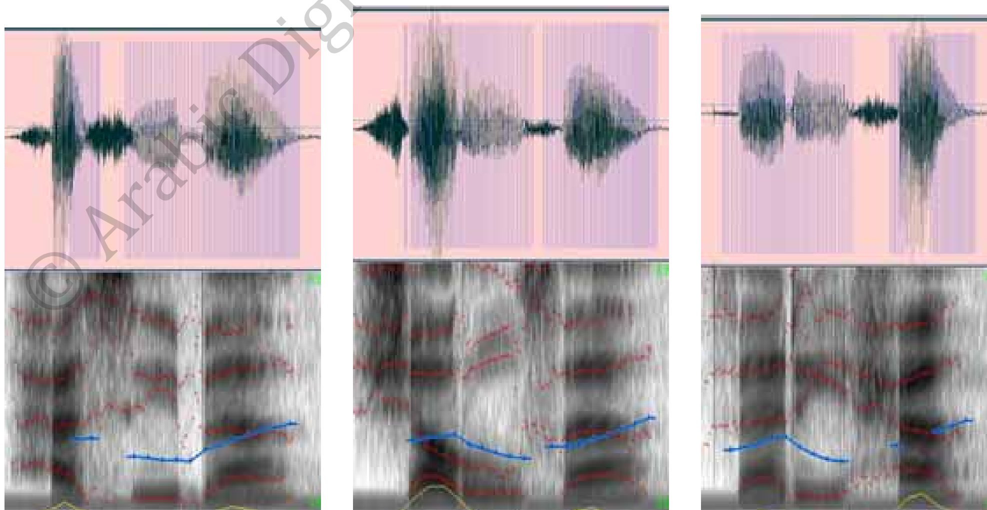
ǫƥɯǅǁƐ üyƻǁƐ ƥƓǆ

. 195-194

: ǇǂǐǄǈǋ !ǁƨǁǁ ŋǐƟƬǁǁ Ǐ ƮǄǁǁ üɏƨǁǁ ƥǤǆ



(Fa ta ḥa ŋİʑ)　(ḏa ra ba ƒƥƮ)　(na ṣa ra ƥƮƮ)



(ḥa si ba ƒƨƟ)　(ŝa ru fa ƹƥƪ)　(fa ri ḥa Ɲƥʑ)

[illegible] :

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
182	51	224	125	52	242	140	49	248	[illegible]
174	48	235	130	51	199	121	49	259	[illegible]
179	49	234	144	51	181	167	49	241	[illegible]
192	49	233	131	50	175	155	47	234	[illegible]
168	48	263	137	51	225	164	50	288	[illegible]
174	48	287	127	50	238	166	47	254	[illegible]
178	49	246	134	51	210	109	49	254	[illegible]

[illegible]

[illegible]

[illegible]

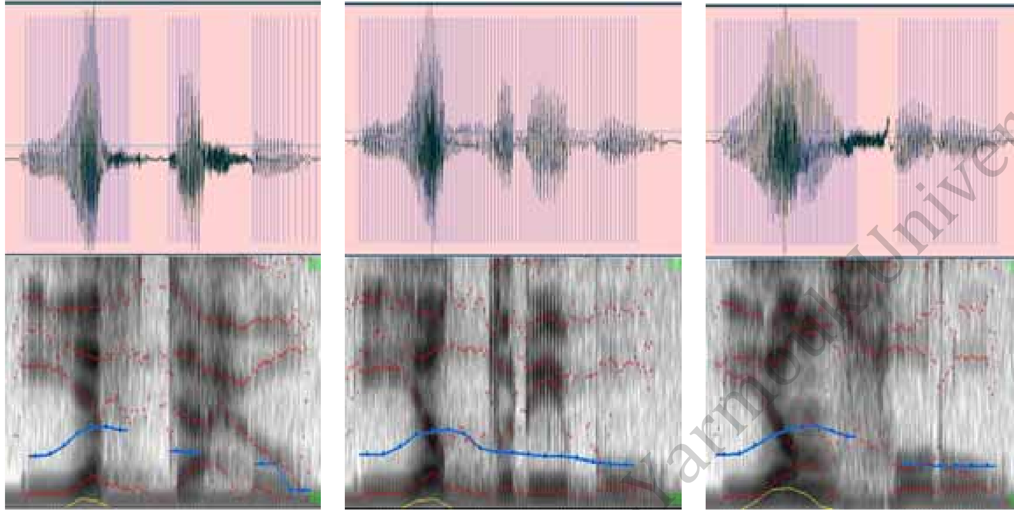
[illegible]

[illegible] 242 [illegible] 234 [illegible] 288

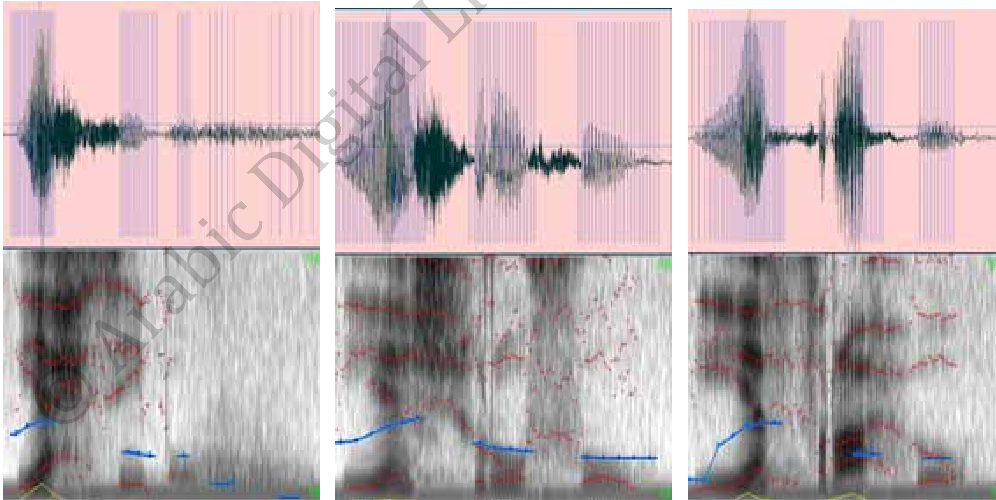
[illegible] 224 [illegible] 287 [illegible] 175 [illegible]

[illegible]

: Ĭlj ǇƗǂƙĎǐčǊ !ǁƑƨǁƐ ƞĭƟƬǁƐ ƱþƑƮĎǁƐ üyƻǁƐ ƥǴǆ



(yaf ta **ḥ**u ƞǂƻĭ) (ya**ḍ** ri bu ƒþƮĭ) (yan **ṣ**u ru þłƬǆĭ)



(ya**ḥ** si bu ƒǁƹƟĭ) (ya**ŝ** ru fu ƹþƪĭ) (yaf ra **ḥ**u Ǌþƻĭ)

[illegible]

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
105	42	242	163	43	269	175	51	279	[illegible]
105	40	157	120	46	228	145	47	323	[illegible]
72	36	203	126	44	231	146	46	376	[illegible]
103	37	119	117	47	259	139	47	341	[illegible]
106	38	194	124	43	261	154	46	335	[illegible]
56	36	233	110	39	236	161	49	262	[illegible]
91	38	191	127	44	247	153	55	319	[illegible]

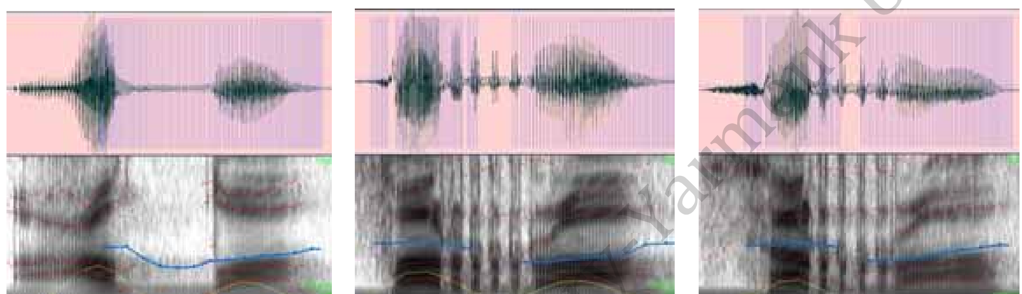
[illegible]

Ŏ!Ɠƙ!ƒ ý‡T!ƒ Ĭ⃞Ƶ ǇĂ‡ŏ ƊƓƪ!ƒ ƠŏơƮ!ƒ ƳƧƓưƊ!ƒ ýƺƨ!ƒ Ĭ⃞Ƶ ƧƕǊ!ƒ ǇƉ ǇŬƒ ýĂƖ!ƒ Ǉ‡ƊŏĂ

ƖƥT!ƒĂ ƖƥƊƗ! ƧƕǊ ăĂƥƉ ŎǊƓƛ ƴƖŏĂ Ü ýĂǕƒ ƴƱƖƊ!ƒ Ĭ⃞Ƶ ƥƥƧƙ!ƒĂ ƖƥT!ƒĂ ƖƥƊƗ! ƧƕǊ ăĂƥƉ ƴƖŏ:

. ƚ !ƓƛƗ!ƒ ƴƱƖƊ!ƒ Ĭ⃞Ƶ ƥƥƧƙ!ƒĂ ƖƥT!ƒĂ ƖƥƊƗ! ƧƕǊ ƻƺưƉ ƴƖŏĂ Ü ŎǊƓƛ!ƒ ƴƱƖƊ!ƒ Ĭ⃞Ƶ ƥƥƧƙ!ƒĂ

: Ĭǉ Ǉƚ‡ƙƊǅǋ Û ƹƴƮƊǅƐ ĬƮƑƊǅƐ üƴƻƐ ƥƓƊ



(caɖ ɖa ņƒ øƳ) (far ra ƥøƺ) (sar ra ƥøɐ)

Ɲ ţ / ĬƊƑƙƐ ƱƯƨƊǅƐ			ţ Ɲ ţ / üǋŬƐ ƱƯƨƊǅƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥƊ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥƊ!ƒ	ƕƊǅ‡ƖƐ
169	48	308	202	52	325	ƥøɐ
166	53	272	210	55	329	ƥøƺ
165	53	224	152	55	448	ņƒ øƳ
167	51	271	188	54	367	Ưɐǋ‡ƊǅƐ

: Ĭlj ǇǰłƙǅǈǊ ƸƴƮǅǁƐ ƱƥƑƮǅǁƐ üƴƻǁƐ ƥǄǆ

(ya caɖ ɖu ǃf ƴĭ) (ya fir ru ƥøƻĭ) (ya sur ru ƥƶĭ)

Ɲ ƫ / ƘǁƑƙǁƐ ƱƯƨǅǁƐ			ƫ Ɲ ƫ / ĬǆƑƙǁƐ ƱƯƨǅǁƐ			Ɲ ƫ / üǋǓƐ ƱƯƨǅǁƐ			
ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƕǅł ǁƐ
108	45	159	189	51	333	140	50	189	ƥøƶĭ
114	46	209	211	58	344	126	50	243	ƥøƻĭ
117	41	233	139	54	374	125	52	236	ǃf øƴĭ
113	44	200	213	54	350	130	51	223	ƯƨǊłǅǁƐ

: ƸƴƮǅǁƐ ƱƥƑƮǅǁƐ üƴƻǁƐ ƥǄǆ üĭłƟł

ƥƿĂ Ü ɵ f + f ɵ f + ɵ f ǇǆǇ ƻùƶƯǆ!ƒ ƳƧǄƯ!ƒ ƴƶƾ! ŎƶƱǁǆ!ƒ Ɣŏłƙ!ƒ ǇĂłƙŏ

ǅŏǁ!ƒ ƚƥǆ!ƒ ăĂƙƪǆ ĬǁƵ ƨǀơ ƥǀƼ Ü ŎǀǄ!ƒ ƴƱǁǆ!ƒ ĬǁƵ ƻƶƯǆ!ƒ ƳƧǄƯǆ!ƒ ƴƶƾ! ƧǈǇ ăĂƿǅ ƨǀơƙ

189 ýћĜǀdž Ŏ5 Ü (ǸƯ ƶŏ) ýƶ5ǁ! 374Ă (ǩ5ŏ) ýƶ5ǁ! 344 Ă (ǩƪŏ) ýƶ5ǁ! 333 Ƚŏ!Ĝk!ƒ

ýĂŰƒ ƴƱǀdžǁ! 236Ă (ǩ5ŏ) ýƶ5!ƒ ǇdžǂýĂŰƒ ƴƱǀdžǁ! 243Ă (ǩƪŏ) ýƶ5!ƒ Ǉdž ýĂŰƒ ƴƱǀdžǁ!

(ǩ5ŏ) ýƶ5ǁ! 209Ă (ǩƪŏ) ýƶ5ǁ! 159 ƽǀơ ƥǀ5 ƚ!ĜǄ!ƒ ƴƱǀdž!ƒ ĜdžǅÜ (ǸƯ ƶŏ) ýƶ5!ƒ Ǉdž

. ƚ!ĜǄ!ƒ ǅǄ ǇdžĂ ýĂŰƒ ǋŏǁŏ ŎǉĜǄ!ƒ ƴƱǀdžǁ! ƥƥdž!ƒ ýĂƱǅ ǇǆǇŏǆƙŏ ĜǉǊ ǇdžĂ Ü (ǸƯ ƶŏ) ýƶ5ǁ! 233Ă

ƴƱǀdž!ƒ ǏǁƵ (ǩƪŏ) ýƶ5!ƒ Ŏ5 ƽǀơ ƥǀ5 Ü ŎǉĜǄ!ƒ ƴƱǀdžǁ! ǋŏ5 ƚǁŏ ư5ŰĜ5 Ü ǀƥƬ!ƒ ýdžĜƵ Ĝdžǅ

Ŏ5 ƽǀơ ýĂŰƒ ƴƱǀdž!ƒ ǇǅǇŏơ Ŏ5 Ü 54 (ǸƯ ƶŏ) ýƶ5!ƒ Ŏ5Ă 58 (ǩ5ŏ) ýƶ5!ƒ Ŏ5Ă 51 ŎǉĜǄ!ƒ

ƽǀơ ƥǀ5 Ü ƚ!ĜǄ!ƒ ƴƱǀdž!ƒ ĜdžǅÜ 52 (ǸƯ ƶŏ) ýƶ5!ƒ Ŏ5Ă 50 (ǩ5ŏ) ýƶ5!ƒ Ŏ5Ă 50 (ǩƪŏ) ýƶ5!ƒ

. 41 (ǸƯ ƶŏ) ýƶ5!ƒ Ŏ5Ă 46 (ǩ5ŏ) ýƶ5!ƒ Ŏ5Ă 45 (ǩƪŏ) ýƶ5!ƒ Ŏ5

ƴƱǀdž!ƒ ǏǁƵ (ǩƪŏ) ýƶ5!ƒ Ŏ5 ƽǀơ ǋǉǫ Ʀǫ Ü ŎǉĜǄ!ƒ ƴƱǀdž!ƒ ǋǆ ƧǄdžƙƪŏ5 ƥƥƧk!ƒ ýdžĜƵ Ĝdžǅ

ýƶ5!ƒ Ǉdž ýĂŰƒ ƴƱǀdž!ƒ ĜdžǅÜ 139 (ǸƯ ƶŏ) ýƶ5!ƒ Ŏ5Ă 211 (ǩ5ŏ) ýƶ5!ƒ Ŏ5Ă 189 ŎǉĜǄ!ƒ

ƴƱǀdž!ƒ ǇǅǇŏơ Ŏ5 Ü 125 (ǸƯ ƶŏ) ýƶ5!ƒ Ŏ5Ă 126 (ǩ5ŏ) ýƶ5!ƒ Ŏ5Ă 140 ƽǀơ ƥǀ5 (ǩƪŏ)

. (ǸƯ ƶŏ)ýƶ5ǁ! 117Ă (ǩ5ŏ) ýƶ5ǁ! 114Ă (ǩƪŏ) ýƶ5ǁ! 108 ƽǀơ ƚ!ĜǄ!ƒ

ƴƱĜǀdž!ƒ Ŏ5 Ŏư Ĝdž!ƒ ǋǁƶ5 ǇƵ ƒƧŏǄǂ ƻǁkƤŏ Ŭ ƻƶưdž!ƒ ƳƧĜưdž!ƒ ýƶ5!Ĝ5 Ü ǇƦǫ

ǇǅƱơŭŏ Ü ƳƧĜưdž!ƒĂ Ŏư Ĝdž!ƒ Ǉdž ýǂ Ŏ5 ǇŏƧŏƤŰƒ ǇŏƶƱǀdž!ƒ Ǉŏǆ ƚǉƨƒĂdž!Ĝǆ5 ÜĜdžǌǉŏǆ ƚǂƧkƬdž!ƒ

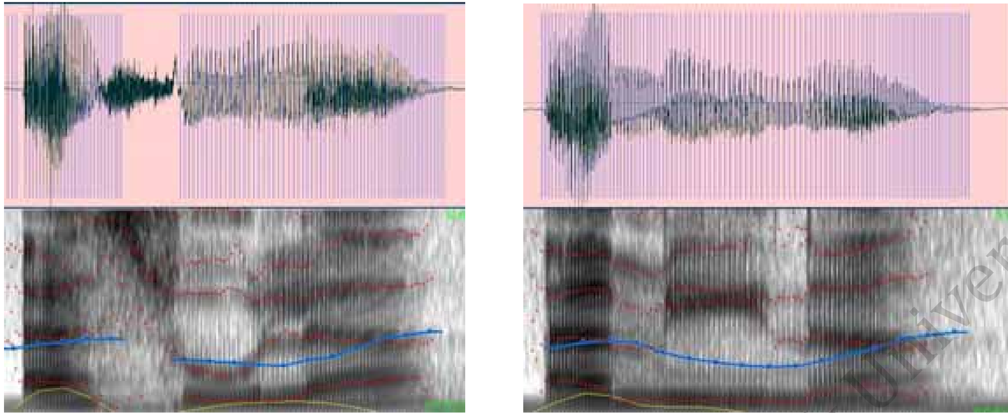
ýƶ5!ƒ ƚŏĜǌǉ Ŏ5 (Ư) ƴƱǀdž!ƒ ĂǊĂ Ü ƴƱĜǀdž!ƒ ǉƦǊ ýǂ Ǉdž ƽǀơkdž!ƒ ĂǊ Ʊǀ5 ƒƥơƒĂ ĜƥƧĜ5

ǇŏơŎ5 Ü ýƶ5!ƒ ƒƦǊ ƚŏĜǌǉ! ƔơĜƮdž!ƒ ǅư!ƒ ƘƑĜƮ Ŏ5 Ǉdžǂŏ ƻŭkƤƒ ƚdžǄ5 (ǸƯ ƶŏ) ƳƧĜưdž!ƒ

Ü ƻŭkƤŰƒ ƒƦǊ ǇƵ ǊkǉƥƥĂ Ü ǋ! ǅƨŭdž!ƒ ĂǊ Ơk5!ƒ ƘƑĜƮ ýĜơ!ƒ ƚƶŏǆƱǆ ǇĜǂ Ü Ŏư Ĝdž!ƒ Ǉǅ

ǇdžĂ Ü ƒƥƥƧk 48 ƚǆƪǉǆ ƚdžĂdž ưdž!ƒ ƥĜư!ƒ ǏǁƵ Ü ƚơĂk5dž!ƒ ƥĜư!ƒ ƥƥƧk ǀƥĜŏƨ ƴƥĂkdž!ƒ ƧŏƩ ǏǁƵĂ

('a ha ba)　　('a sa ra)　　('a xa ḏa)



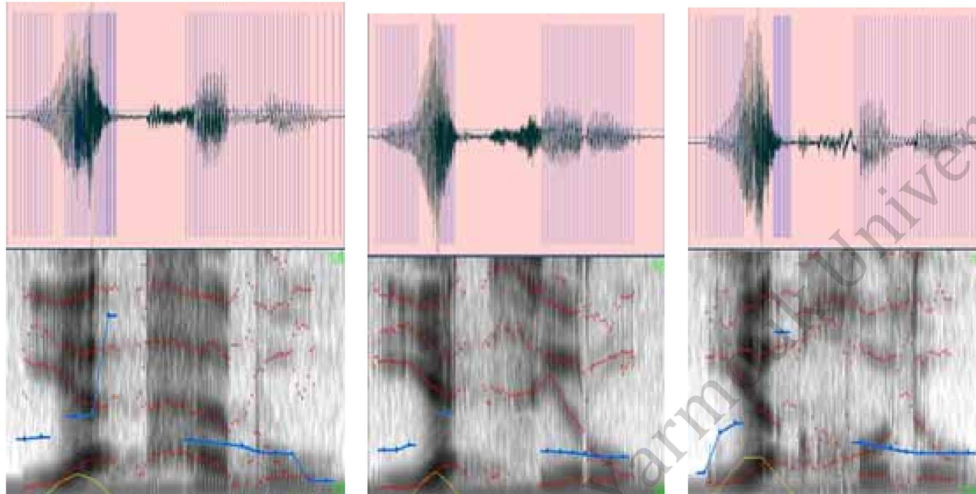
('a su la üłƨ ƈ) ('a mi na Džňžƈ)

: üŇǰŬƐ ƦŇǰDžŇDžǁƐ Ĭ ƮƑDžǁƐ üyƧǁƐ ƥƓǆ üĭǂƟǂ

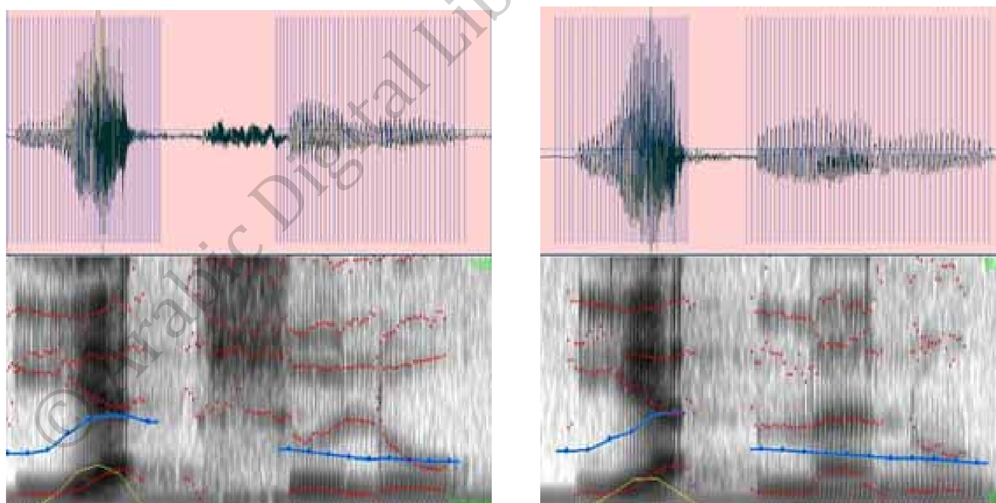
Ɲ ţ / ƘǁƑƘǁƐ ƯƯƨDžǁƐ			Ɲ ţ / Ĭ ǆƑƘǁƐ ƯƯƨDžǁƐ			Ɲ ţ / üŇǰŬƐ ƯƯƨDžǁƐ			
ƥƥƧƘ!ƒ	ǈƥT!ƒ	ǈƥdž!ƒ	ƥƥƧƘ!ƒ	ǈƥT!ƒ	ǈƥdž!ƒ	ƥƥƧƘ!ƒ	ǈƥT!ƒ	ǈƥdž!ƒ	ƕDžǂǀǁƐ
170	52	270	152	54	210	186	56	105	ƤǛǰƈ
130	56	262	137	54	242	176	55	110	ƥłƨ ƈ
177	50	273	152	52	222	197	56	115	ƒǂǰƈ
168	47	275	156	51	217	185	54	99	Džňžƈ
182	50	285	139	51	283	189	54	151	üłƨ ƈ
165	51	273	147	52	235	187	55	116	Ư ƨ ŇǂDžǁƐ

[illegible]

: Ĭlj ǇĦƙDžčŅ üŅǕɛ ŖŅĐŽŅĐžǁɛ ƱþƑȚDžǁɛ üуƻǁɛ þĜǆ



(ya' ha bu ƒǉĐĭ) (ya' si ru þľɛĐĭ) (ya' xu **đ**u ƤǕĐĭ)



(ya' su lu üłɛĐĭ) (ya' ma nu ĎžĐžĐĭ)

: üNjŬɛ ŖNjDžNDžǁɛ ƱþƑƮDžǁɛ üƴƻǁɛ þƓǅ üĭǂƟƗ

Ɲ ƫ / ƘǁƑƙǁɛ ƲƲƨDžǁɛ			Ɲ ƫ / Ĭǆ̌Ƒƙǁɛ ƲƲƨDžǁɛ			ƫ Ɲ ƫ / üNjŬɛ ƲƲƨDžǁɛ			
þþƧƙ!ƒ	ŀþT!ƒ	ŀþǆ!ƒ	þþƧƙ!ƒ	ŀþT!ƒ	ŀþǆ!ƒ	þþƧƙ!ƒ	ŀþT!ƒ	ŀþǆ!ƒ	ƕDžǂǁɛ
108	44	248	121	46	211	128	56	168	ƤǛþĐĭ
110	43	298	117	44	219	154	52	246	þǕƨĐĭ
93	42	260	128	45	243	200	51	231	ƒǂĵĐĭ
110	43	291	123	46	228	161	52	238	DžĎĐĭ
116	45	305	130	46	216	161	54	304	üƨĐĭ
107	43	280	124	45	223	161	53	217	ƲƨNjƗDžǁɛ

+ Ɵ ƒ + ƒ Ɵ ƒ ŎƶƱǀǆ!ƒ Ɣǒǂƻƙ!ƒ LJǆ ýǍŪƒ ƨǍǆnjǆ!ƒ YƧƓƣǆ!ƒ ýƶƽ!ƒ LJǍǂƙǒ

Ü (Ɵ ƒ) yƱǀǆ!ƒ yǆ (ƒ Ɵ ƒ) yƱǀǆ!ƒ ŀþǆ Ǵnjǒ5 ƔƧƓǀƙ Ŏƙ!ƒ yƣƒǍǆ!ƒ LJǆ ýƶ!Ǎ Ɵ ƒ

ƔƮƓĵƙ! ƒƧƲǈǍ YƧƓƣǆ!ƒ ýƶƽ!ƒ LJD Ŭƹ Ü ŀƨǆnj!Ǵƅ Ǵnjƙǈǆ Ü(ƒ Ɵ ƒ) yƱǀǆ!ƒ LJǍǂǒ ǴǆþǈƷ

Ŏ5 ýƮƓơ!ƒ ƒ ǀǈ!ƒ yǆ ƔƮƓĵƙǒ! NJǒ5 ƨƧƕD ƧǍþ ŀþTǀ! LJƓǂ Ü yƱƓǀǆ!ƒ ƗǒǀƗ yǆ (ƒ Ɵ ƒ)

yƱǀǆ!ƒ ĬǀƷ 45Ǎ Ü ýǍŪƒ yƱǀǆ!ƒ ĬǀƷ 53 ǴNjƧƒþǀǆ ŀþT ƪǀơ ƗǒƠ Ü(ƒ Ɵ ƒ) yƱǀǆ!ƒ

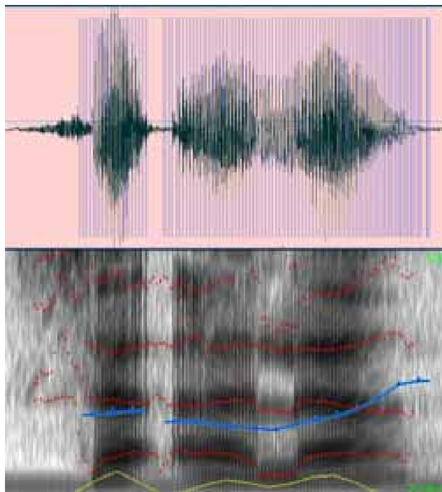
ýƶƽ!ƒ Ŏ5 þþƧƙ!ƒǍ ŀþT!ƒǍ ŀþǆǀ! ƧƕǈǬ ǎǍpD yǀǒ Ŏ!ǴƙǀǴƅǍ Ü Ɨ!ǴƛƒyƱǀǆ!ƒ ĬǀƷ 43Ǎ Ü Ŏǈǵƛ!ƒ

ǴnjƛǀǴƛǍ Ɨ!Ǵƛ!ƒ yƱǀǆ!ƒ ĬǀƷ ŀþǆǀ! ƧƕǈǬ ǎǍpD ŎǈǴƛǍ Ü ýǍŪƒ yƱǀǆ!ƒ ĬǀƷ ýǍŪƒ ƨǍǆnjǆ!ƒ YƧƓƣǆ!ƒ

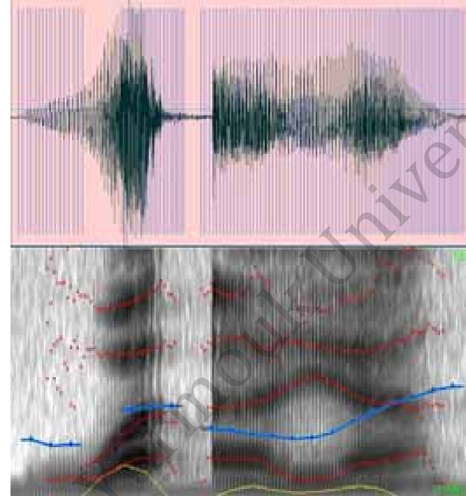
þþƧƙ ĬǀƷD ŎǈǴƛǍ Ü Ɨ!Ǵƛ!ƒ DžƛLJǆǍ ŎǈǴƛ!ƒ yƱǀǆ!ƒ Ĭǀƶ5 ŀþT ǎǍpD ŎǈǴƛ ǴǆD Ü Ŏǈǵƛ!ƒ yƱǀǆ!ƒ ĬǀƷ

.ŎǈǴƛ!ƒ DžƛLJǆǍ Ɨ!Ǵƛ!ƒ yƱǀǆ!ƒ ĬǀƷ

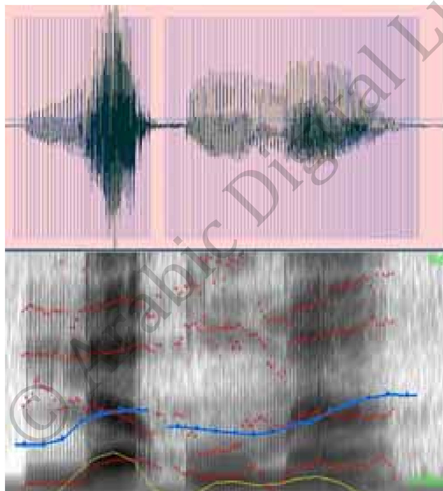
: Ĭlj ǈĦǩĐǅǊ Û Ưƨ Ǌǁ ȐǋǅǋǅǁƐ Ĭ ȚƑǅǁƐ üỿǁƐ ƥƓ



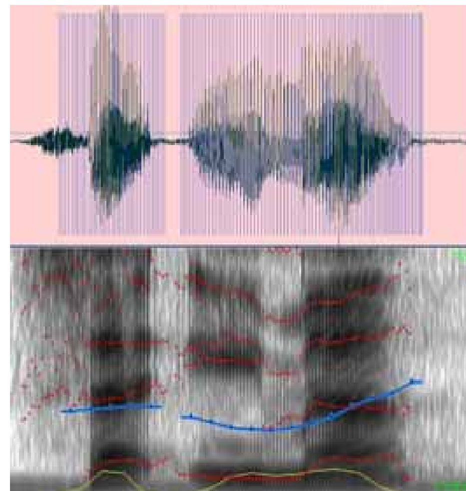
(sa 'a la   üƟƨ)



(wa 'a ya ăǅǋ)



(la 'u ma !Ɗǁ)



(sa 'i ma !ƟƏƨ)

Ɲ ţ / ƘǁƑƙǁǁ ƯƲƨƉŽǁǁ			Ɲ ţ / ǏǜƑƙǁǁ ƯƲƨƉŽǁǁ			Ɲ ţ / üǋŬƐ ƯƲƨƉŽǁǁ		
ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆǉƒǃƒǃƒǃƒǃƒǃƒǃƒǃƒǃƒǃƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕǅŽǂǀǁƐ
192	50	268	142	51	223	153	52	346	ǀăƈǋ
194	50	275	152	51	213	177	51	289	üƉƨ
197	51	255	155	52	252	186	50	279	!θƨ
196	51	247	149	52	203	155	54	348	!Ɗǁ
195	51	261	150	52	223	168	52	316	ƯƨǋǂƉŽǁƐ

: ƯƨǋǁƐ ƦǋƉŽǋƉŽǁƐ Ǐ ƮƑƉŽǁƐ üƴƵǁƐ ƥƓǆ üǏǂƟł

ÜΘ f +Θ f +Θ f Ŏƶƻǀǆ!ƒ Ɣŏǂƨƙ!ƒ ǇǆǏ ƻƪĂ!ƒ ƨĂǆǌǆ!ƒ ŎƲƓǆ!ƒ ýƶƺ!ƒ ǇĂǂƙŏ

ƒƦǋ ƴƻƓǀǆ ǇŏƕƼ ǇǆƼ Ɩƥǆ ýĂƻƊ Ü ƻƪĂ!ƒ ƨĂǆǌǆ!ƒ ŎƲƓǆ!ƒ ýƶƺ!ƒ ǇǆƼ ýĂǕƒ ƴƻǀǆ!ƒ ƪǀơ ƥƿĂ

łơǁƮǆ! ƘƇƓƞ ƖƥT!ƒ ǀĂƿ ǇƊ ǇŏơŎƺ Ü ŎǉƓǅ!ƒ ƊǅǇǆĂ Ü ł!ƓǅǄ!ƒ ƴƻǀǆ!ƒ ýĂƻ!ƒ Ŏƺ ǉǖƙ ÜƳĂǉ!ƒ

ÜǀƧĂƪǂǆ ŎǉƓǅ!ƒ ƴƻǀǆ!ƒ Ŏƺ ǀƨǆǌ!ƒ ƘƇƓƞ ƓǆƥǉƵ ŎǋĂ Ü ƖƥơƒĂ ł!Ɠơ ƇƓǉĂƙƪƓƕ ƓƲŏƊ ýĂǕƒ ƴƻǀǆ!ƒ

Ŏƺ ƖƥT ăĂƿƊ ŎǉƓǅ ŎǉƓǅ!ƒ ƴƻǀǆ!ƒ ýƙơƒ Ɠǆǂ Ü ýĂǕƒ ƴƻǀǆ!ƒ ƖƥT ǇǆƼ ăĂƿƊ ƓǌƙƥT ƘǉƓǂ ƥǀƺ

ǇĂǂŏ Ŏ!Ɠƙ!ƓƕĂ Ü ŎǉƓǅ!ƒ ƒƧŏƤƊĂ ýĂǕƒ ƊǅǇǆĂ ƧŏƤǕƒ ƴƻǀǆ!ƒ łơǁƮǆ! ƇƓƞ ƥǀƺ ƥƥƧƙ!ƒ ƓǆƊ ÜŁǆǁǂ!ƒ

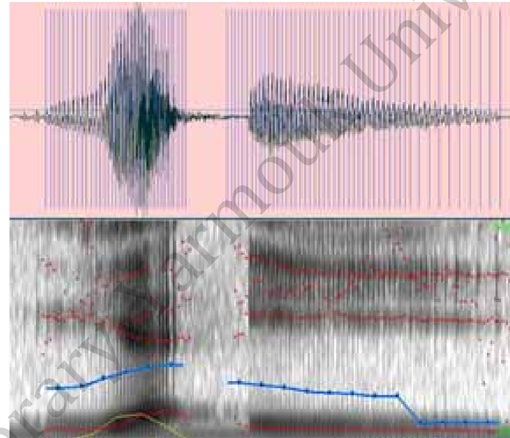
ƴƻǀǆ!ƒ ǏǁƵ Ɩƥǆ ýĂƻƊ ŎǉƓǅĂ Ü ýĂǕƒ ƴƻǀǆ!ƒ ǏǁƵ ƻƪĂ!ƒ ƨĂǆǌǆ ŎƲƓǆ!ƒ ýƶƺ!ƒ Ŏƺ Ɩƥǆ!ƒ Ƨƕǉ

ŎǉƓǅ!ƒĂ ýĂǕƒ ǇŏƶƻǀǆƼ!ƒ ǏǁƵ ƓŏĂƿ ƖƥT!ƒ Ƨƕǉ ǇĂǂŏĂ Ü ŎǉƓǅ!ƒ ƴƻǀǆ!ƒ ǏǁƵ Ɩƥǆ ýƿƊĂ Ü ł!ƓǅǄ!ƒ

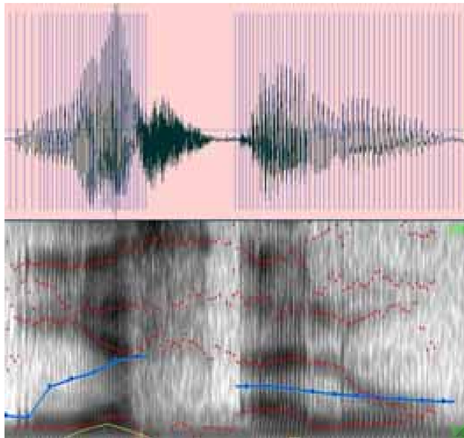
ĬǁƵ Ŏǉƹ̂Ă Ü ƚ!ƹ̂!ƒ ƴƱǀƌ!ƒ ĬǁƵ ƥƥƨƙ!ƒ ƨƕǉ ǇĂƚŏĂ Ü ƚ!ƹ̂!ƒ ƴƱǀƌ!ƒ ĬǁƵ ƚƥƬ ƻƶư ǇĂƚƙĂ

. Ŏǉƹ̂!ƒ ƴƱǀƌ!ƒ ĬǁƵ ƥƥƨƙ ĬǁƵ ƚ!ƹ̂Ă ýĂŪƒ ƴƱǀƌ!ƒ ĬǁƵ ƥƥƨƙ

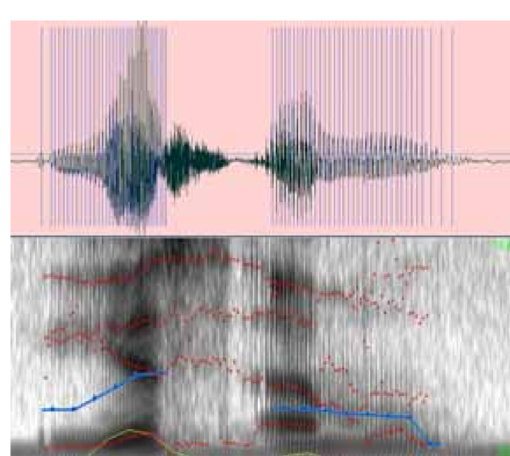
: Ĭǀǉ ǇɈƙǅǈǊ Ưƨǋǁɛ ȐǋǅǊǅǁɛ ƱƥƑƮǅǁɛ üƴƸǁɛ ƥƹ̂



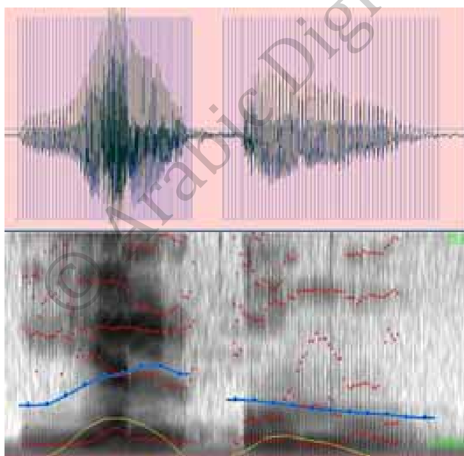
(ya 'Ī Ĭǝĭ)



(yas 'a lu üƉƨĭ)



(yas 'a mu !Ɖƨĭ)



(yal 'u mu !Ɗƚĭ)

ꞐꞐ ţ / Ĭǚƒƙǁɛ ƱƯʦDžǁɛ			Ꞑ ţ / üŊǰŬɛ ƱƯʦDžǁɛ			
ꞃꞃƧƙ!ƒ	ɭꞃT!ƒ	ɭꞃǳ!ƒ	ꞃꞃƧƙ!ƒ	ɭꞃT!ƒ	ɭꞃǳ!ƒ	ƕDŽǂǀǁɛ
105	45	528	159	53	228	Ĭǝĭ
105	45	528	159	53	228	ƯƨǊǂDŽǁɛ

Ꞑ ţ / Ʞǁƒƙǁɛ ƱƯʦDŽǁɛ			Ꞑ ţ / Ĭǚƒƙǁɛ ƱƯʦDŽǁɛ			ţ Ꞑ ţ / üŊǰŬɛ ƱƯʦDŽǁɛ			
ꞃꞃƧƙ!ƒ	ɭꞃT!ƒ	ɭꞃǳ!ƒ	ꞃꞃƧƙ!ƒ	ɭꞃT!ƒ	ɭꞃǳ!ƒ	ꞃꞃƧƙ!ƒ	ɭꞃT!ƒ	ɭꞃǳ!ƒ	ƕDŽǂǀǁɛ
113	46	228	134	49	119	166	49	401	üĐƨĭ
105	46	217	129	51	96	164	51	409	!Đƨĭ
116	50	254	137	54	114	176	54	459	!Dǂĭ
111	47	233	133	51	110	127	51	416	ƯƨǊǂDŽǁɛ

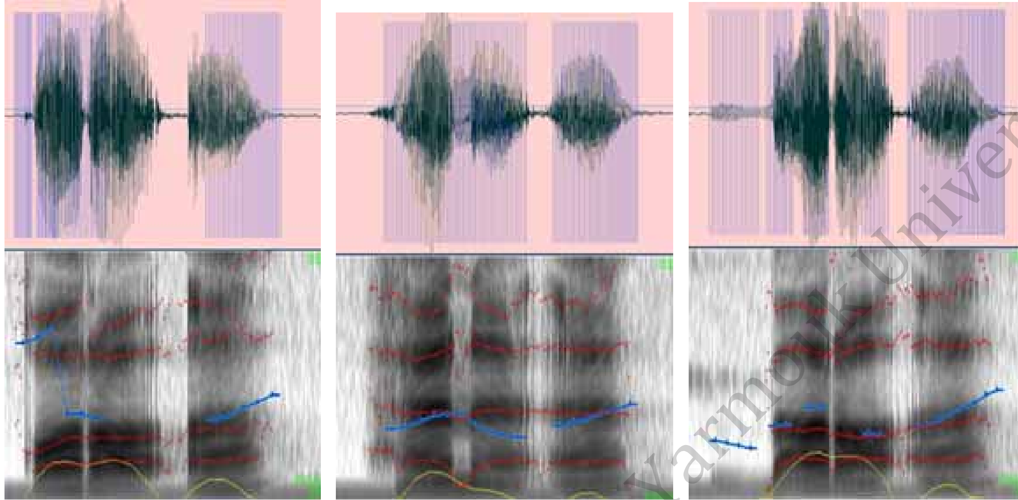
: ƯƨǊǁɛ ꞰǊDŽǊDŽǁɛ ƱꞃƑƮDŽǁɛ üƴƻǁɛ ꞵǤǚ üĭǂƟƗ

ƒ + Ɵ ƒ + ƒ Ɵ ƒ ŎʑƱǀǚ!ƒ Ɣŏǂ Ƨƙ!ƒ Ǉǚ ƱƪĂ!ƒ ƨĂǚǌǚ!ƒ ƳƧǴư ǚ!ƒ ýʑƽ!ƒ ǇĂǂƙŏ

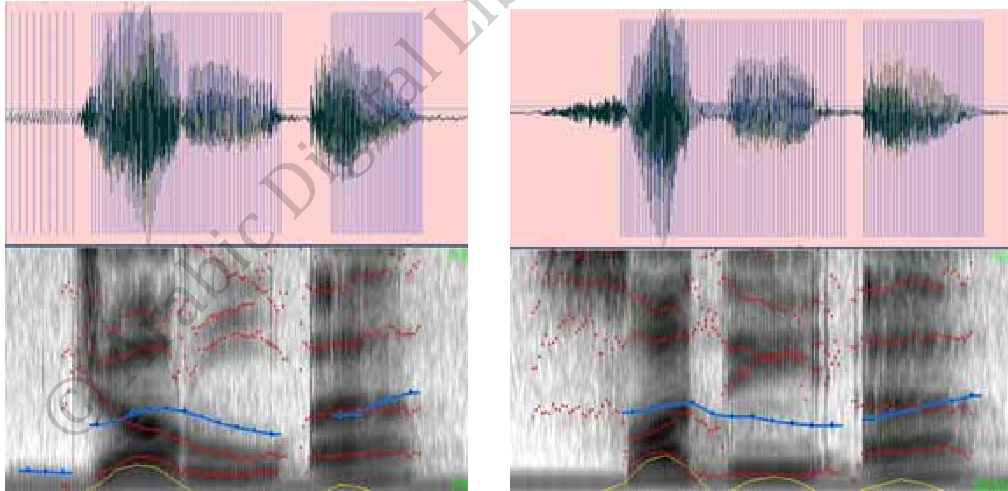
+ Ɵ ƒ) Ǉǚ ǇĂǂǚ!ƒ (ŎƑŏ) ýʑƽǃ! Ŏʑ Ʊǀǚ!ƒ Ɣŏǂ Ƨƙ!ƒ ƨǀơ ꞃƿĂ Ü(Ɵ Ɵ ƒ + Ɵ ƒ ĂĐ Ɵ

ƨǀơ ƚŏơ Ü ŎǈǤ!ƒ ƴƱǀǚ!ƒ ƔǴƪơ ĬǃƵ ýĂǕƒ ǋʑƱǀǚ ĬǃƵ Ơư ĂĐ ƒꞃꞃƧƙĂ ɭꞃT Ü Ɵ Ɵ ƒ

:Ĭlj ǇĦƙDžčNj ƥƠǀŎǫ ƦNjDžNJDžǁǫ Ĭ ƮƒDžǁǫ üƴƻǁǫ ƥƓǆ



(qa ra 'a ǆƥƴ) (ha na 'a ƉǆǁǇ) (ba ra 'a ǆƥƓ)



(**ğ**a ru 'a Ɖƥǁ) (**ş**a di 'a ǫǆǁT)

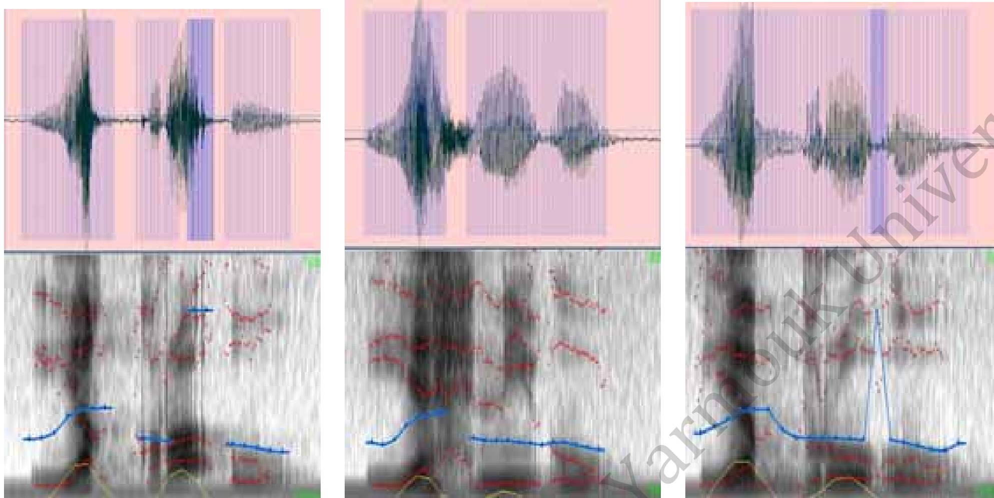
[illegible] :

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
194	50	301	181	54	269	154	55	372	[illegible]
187	49	228	157	50	215	177	53	276	[illegible]
198	52	248	181	55	237	165	56	279	[illegible]
191	49	246	158	51	271	184	52	348	[illegible]
192	49	236	151	48	272	175	51	365	[illegible]
192	50	252	166	52	253	171	53	328	[illegible]

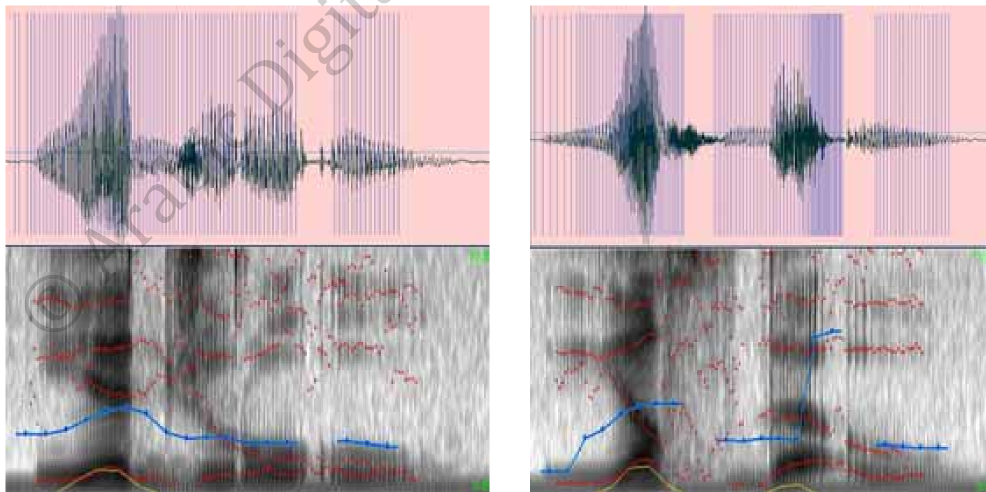
[illegible]

[illegible]

: Ĭlj ǈĦƙƊžƈǈ ƥƱǪŎɛ ƦǋǊƊžǊǆƊžǁɛ ƱƥƑƮƊžǁɛ üyƻǁɛ



(yaq ra 'u ƈƥƫĭ) (yah ni 'u ƎŇǊĭ) (yab ru 'u ƊƥƓĭ)



(ya**ğ** ru 'u ƊƥƜĭ) (ya**ş** Da 'u ƈƣTĭ)

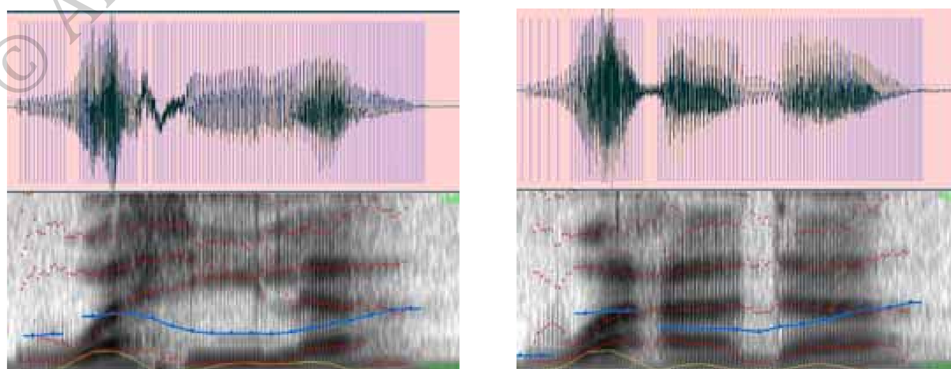
[illegible] :

[illegible] / Ɲ ţ			[illegible] / Ɲ ţ			[illegible] / ţ Ɲ ţ			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
123	47	163	135	52	226	165	53	325	[illegible]
124	47	163	132	49	296	155	50	340	[illegible]
120	43	192	166	52	231	171	53	339	[illegible]
100	41	188	186	48	264	165	51	339	[illegible]
118	43	136	152	48	149	160	51	412	[illegible]
117	44	168	154	50	233	163	52	351	[illegible]

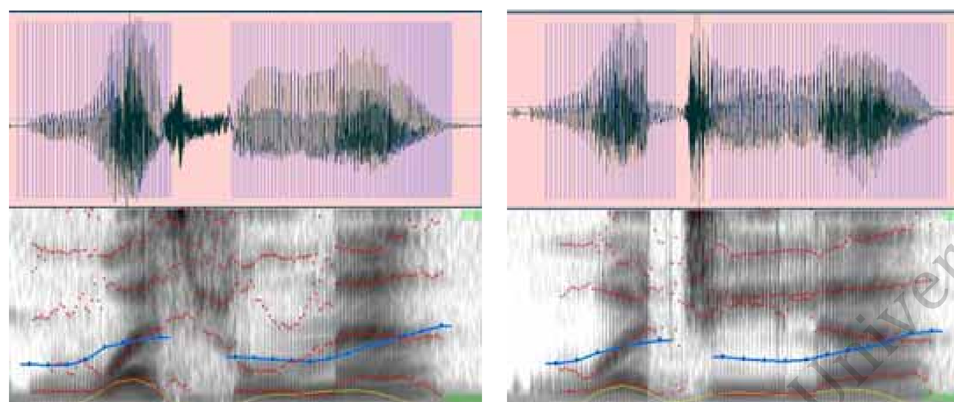
[illegible] ϴ ƒ + ϴ ƒ + ƒ ϴ ƒ

[illegible]

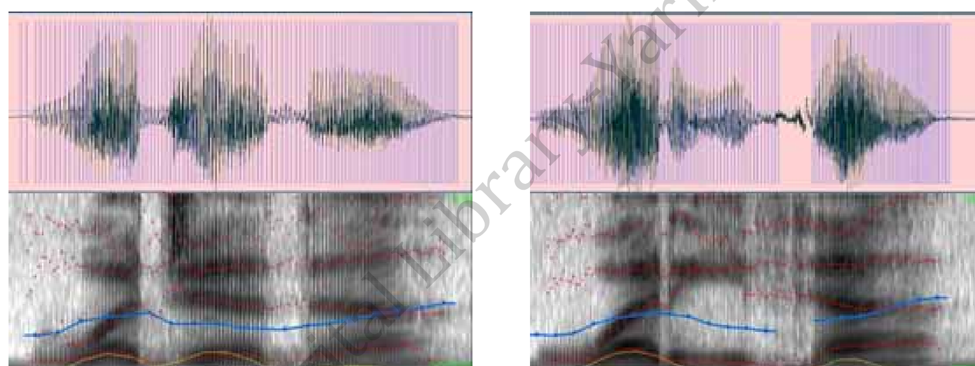
[illegible] :



(wa hi la [illegible])　　　　(wa ca da [illegible])



(wa su ma !ƙǸ)   (wa **ğ**i la üƜǸ)



(wa **ğ**a da ǫƜǸ)   (wa ri **ṭ**h ƘƥǸ)

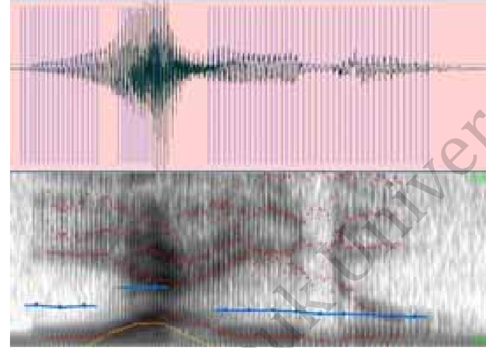
Ɲ ƫ / ƘǁƑƙǁƐ ƯƲƽƊǁƐ			Ɲ ƫ / ĬǆƑƙǁƐ ƯƲƽƊǁƐ			Ɲ ƫ / üǸǓƐ ƯƲƽƊǁƐ			
ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƥƥƧƙ!ƒ	ƚƥT!ƒ	ƚƥǆ!ƒ	ƕƊǅǂǀǁƐ
174	50	247	133	51	207	135	52	271	ǫYǸ
171	49	270	127	51	192	147	52	282	üĬǰǸ
176	51	246	134	52	239	147	52	275	üƜǸ

179	51	236	132	51	328	148	52	307	[illegible]
189	50	274	150	48	270	152	53	280	[illegible]
177	50	240	146	53	229	154	52	246	[illegible]
178	50	252	137	51	244	147	52	281	[illegible]

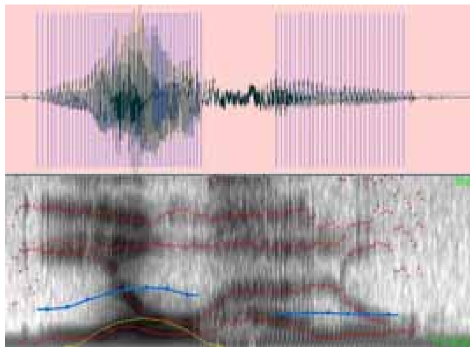
[illegible] :

[illegible]

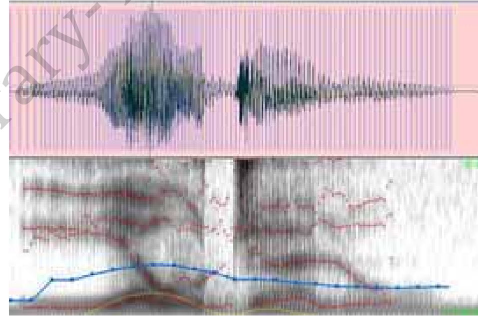
: Ĭlj Ljǂǩǅǯǋ üǇǩǅǰǁ ƱþǇȚǅǰǁ üyƻǁ þǤǉ



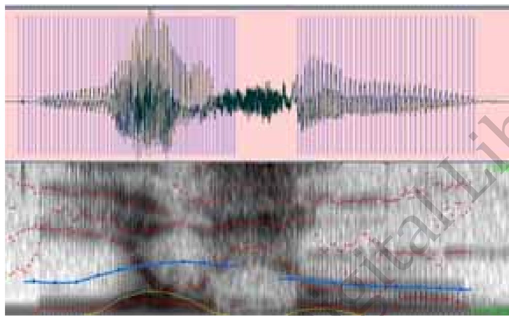
(ya ci du ǫǰǏĭ)



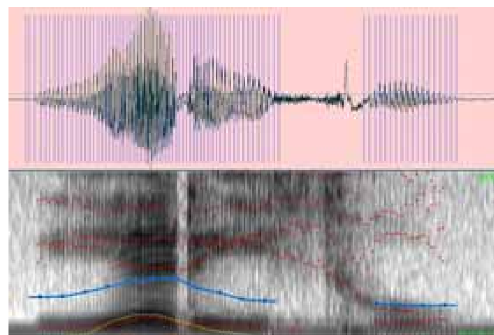
(yaw ha lu üljǋĭ)



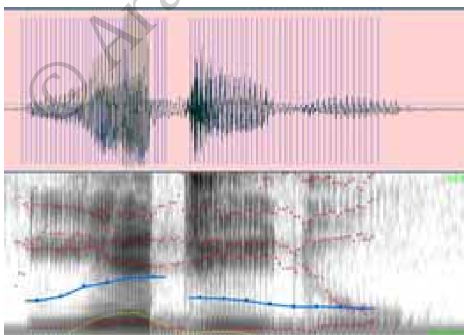
(yaw ğa lu üǁǁǋĭ)



(yaw su mu !ǂǋĭ)



(ya ri ṭu Ǩþĭ)



(ya ğu du ǫǂǁĭ)

: üƑƙƊǁǃ ƟƥƑƮƊǁǃ üƴƧǁǃ ƥǴǆ üǏƚƟƚ

Ɲ ƫ / ƘǁƑƙǁǃ ƯƠƿƊǁǃ			Ɲ ƫ / ǏǆƑƙǁǃ ƯƠƿƊǁǃ			Ɲ ƫ / üǋǙǃ ƯƠƿƊǁǃ			
ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƕƊƚǀǁǃ
106	43	153	117	46	189	152	53	300	ǫǰǐ
109	43	184	137	49	261	160	53	279	Ƙƥǐ
106	41	119	124	49	188	166	54	267	ǫǁǁǐ
107	42	152	126	48	213	159	53	282	ƯƨǋƚƊǁǃ

Ɲ ƫ / ƘǁƑƙǁǃ ƯƠƿƊǁǃ			Ɲ ƫ / ǏǆƑƙǁǃ ƯƠƿƊǁǃ			ƫ Ɲ ƫ / üǋǙǃ ƯƠƿƊǁǃ			
ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƕƊƚǀǁǃ
113	43	265	114	46	135	161	54	370	üǉǋǐ
107	43	245	125	51	151	145	53	416	üǁǁǋǐ
115	49	228	167	48	118	160	54	377	!ǩǋǐ
112	45	246	135	48	135	155	54	388	ƯƨǋƚƊǁǃ

ƒ ǍƊÜ Ɵ ƒ + Ɵ ƒ + Ɵ ƒ ǑƶƱǀǆ!ƒ Ɣǒƚƨƙ!ƒ ǇǆǏ ýǴǆ!ƒ ƳƧǴưǆ!ƒ ýƺ!ƒ ǇǍƚƙǒ

ƒ) Ɣǒƚƨƙ!ƒ ǐƦ ýǴǆ!ƒ ƳƧǴưǆ!ƒ ýƺ!ƒ ǑƼ ƨǉǋ!ƒ ýǆƒǍƵ ǄǗƙǉƙ Ü Ɵ ƒ + Ɵ ƒ + ƒ Ɵ

ƘǴƞƧƥ ăǍpǄ ýǍǕƒ ƴƱǀǆ!ƒ ýƙơǒƼ Ü ǴǌƙǒǴǌǉǌ Ǐƙơ ƚǆǁƚ!ƒ ƚǒƒƥǉ ǇǆǏ Ü(Ɵ ƒ + Ɵ ƒ + Ɵ

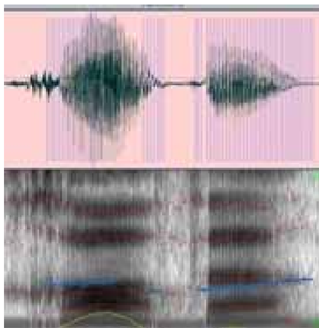
. ƚ !ǴǍ!ƒ ǄǍ ǇǆǏǍ ǑǉǴǍ!ƒ ƴƱǀǆ!ƒ ǋǒǁǒ ÜƧǉǋ!ƒ

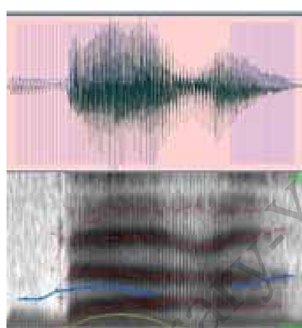
[illegible]

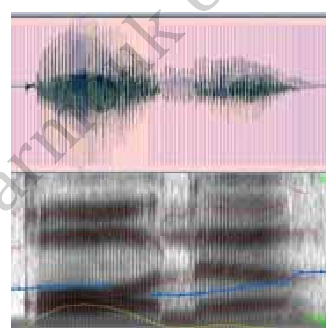
[illegible]

[illegible]

[illegible] :







(xā fa [illegible]) (bā ca [illegible]) (qā la [illegible])

[illegible] :

[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
150	48	209	153	54	264	[illegible]
148	50	257	157	51	273	[illegible]
146	46	230	161	52	393	[illegible]
148	48	232	157	52	310	[illegible]

(ca wi ra [illegible])

(ġa yi da [illegible])

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
157	49	241	140	47	253	133	50	288	[illegible]
164	49	188	134	51	245	155	51	261	[illegible]
161	49	215	137	49	249	144	51	275	[illegible]

[illegible]

ǤdžƉ Ü Ƀ !ǤǼ!ƒ ƊǚǼ ŎǱǤǼ!ƒ ƴƱǀdž!ƒ ƊǚǼ ǀƥdž ýǍƱƌƚ ýǍŪƒ ƴƱǀdžǚ! ƊƱƙǰdž ǀƥdž!ƒ ýdžǤƺ5 ŎǱǤǼ!ƒ Ɣŏƚƨƙ!ƒ ǤdžƉ

Ƀdžǚƚ Ŏ5Ǎ Ü ŎǱǤǼ!ƒ ƊǚǼ Ƀ !ǤǼ!ƒ ƝǒǚŏǀƥT ǏǚƵƌƚ ýǍŪƒ ƴƱǀdž!ƒ ýƙơŏ (ƥŏƸ) ýƺ5!Ǥ5 ǀƥT!ƒ ýdžǤƵ

ƥŏƸ Ƀdžǚƚ Ŏ55 ƥƥƨƙ!ƒ ýdžǤƵ ǤdžƉ Ü Ƀ !ǤǼ!ƒ ǤdžƞǰƵ ýǀŏǍ Ü ŎǱǤǼ!ƒ ƴdž ýǍŪƒ ƴƱǀdž!ƒ ǎǍǤƪƙŏ Ü (ƨǍƵ)

(ƨǍƵ) Ƀdžǚƚ ƴdž ǁ!Ʀƚ Ʃŏ! ƨdžŪƒǍ Ü ýǍŪƒ ƊǚǼ ǇdžǍ ŎǱǤǼ!ƒ ƝǒǚŏƥƥƨƙǏǚƵƉ ƨŏƤŪƒ ƴƱǀdž!ƒ ƭǀơŏ

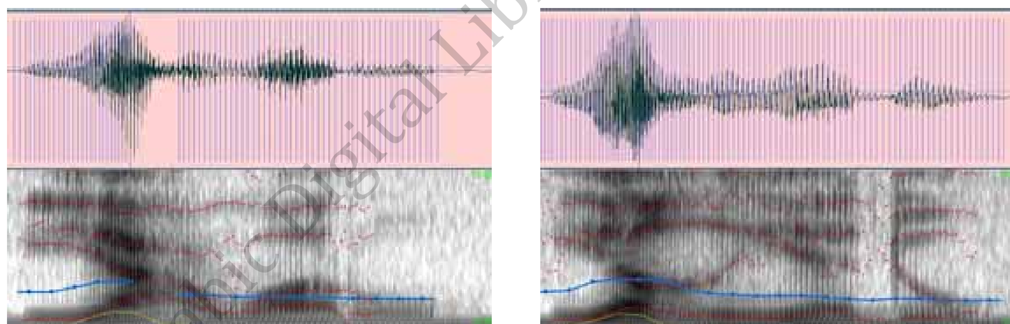
ýƺ5!ƒ Ŏ5 ƔƒƨƱƯŬƒ ƒƦǋ Ü ŎǱǤǼ!ƒ ƊǚǼ ǇdžǍ ýǍŪƒ ƝǒǚŏƥƥƨƙǏǚƵƉ ƨŏƤŪƒ ƴƱǀdž!ƒ ǤǌŏƸǚŏ Ŏƙ!ƒ

. ǤǌǤdžƺƙƪƒ ɃǚƥǍ ƳǍǱ!ƒ ƒƦǋ ƘǤdžǚƚ Ƀǚƥ ƝǱƵ Ɲƙǰ

: Ǐǰ ǰɃƙƊǌ Ů ƸǋƜŬƐ ƱƥƑƬƊǁƐ ǖƴƻǁƐ ƥǤdž

(ya xā fu ƸƑƆǏ)   (ya bī cu ƯǏǤǏ)   (ya qū lu ǖǋƽǏ)

/ Ɲ ƫ / ƘǁƒƙǁƐ ƊƊƽƨǊǁƐ			/ Ɲ Ɲ ƫ / ĬǆƒƙǁƐ ƊƊƽƨǊǁƐ			/ Ɲ ƫ / üǋǓƐ ƊƊƽƨǊǁƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕǄǂǁƐ
105	40	145	147	51	232	142	46	222	üǋƾĭ
105	39	175	146	50	255	128	48	230	ƊĭĜĭ
108	38	197	150	51	262	127	45	209	ƸƑǇĭ
106	39	172	148	51	250	132	46	220	ƯƨǋǂǄǁƐ

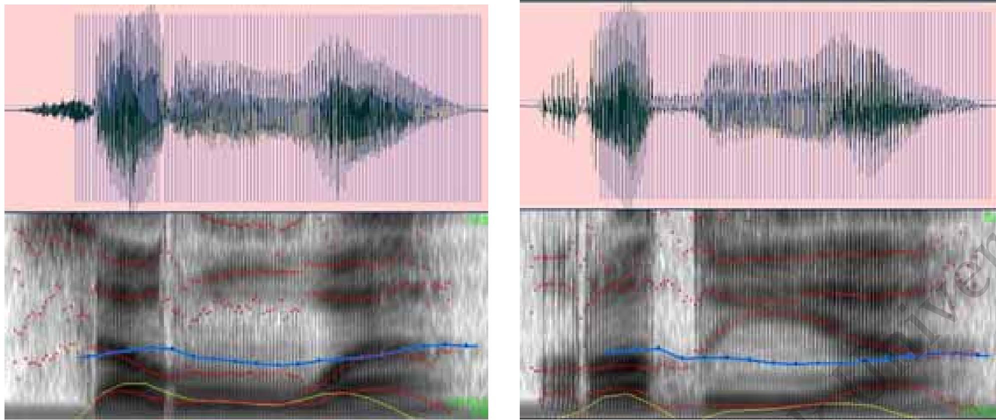


(yac wa ru ƥǋƴĭ)

(yaġ ya du ƣĭƸĭ)

Ɲ ƫ / ƘǁƒƙǁƐ ƊƊƽƨǊǁƐ			Ɲ ƫ / ĬǆƒƙǁƐ ƊƊƽƨǊǁƐ			ƫ Ɲ ƫ / üǋǓƐ ƊƊƽƨǊǁƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕǄǂǁƐ
103	39	171	113	45	222	135	48	328	ƣĭƸĭ
108	35	171	116	38	212	145	49	264	ƥǋƴĭ
106	37	171	115	42	217	140	49	296	ƯƨǋǂǄǁƐ

(sa cā)　　(ra mā)　　(da cā)



(sa ru wa Ǹĵƀƨ)　　　　(ra ɖi ya ĬǨƬƥ)

: ƫ ƼƑdžǁƐ Ĭ ƬƑDŽǁƐ üƴƧǁƐ ƥǴdž üǐǂƟƗ

ƝƝ ƫ / ĬǝƑƙǁƐ ƯƯƽDŽǁƐ			Ɲ ƫ / üǸǗƐ ƯƯƽDŽǁƐ			
ββƧƙ!ƒ	lβT!ƒ	lβdž!ƒ	ββƧƙ!ƒ	lβT!ƒ	lβdž!ƒ	ƶDŽǂǀǁƐ
158	51	452	166	52	278	ƑYɋ
155	50	520	170	53	187	ĂDžβ
153	52	513	178	53	211	Ăƴƨ
155	51	495	171	53	225	ƱǸDžǕDŽǁƐ

Ɵ ƒ ĂD Ü Ɵ Ɵ ƒ + Ɵ ƒ LJdž ƒ ƿǴǰ!ƒ Ŏƣǵdž!ƒ ýƺƽǁ! ŎƺƱldž!ƒ Ɣŏǂƻƙ!ƒ LJĂǂƙŏ

ýdžǴƵĂ ÜƘǴdžǁǂ!ƒ ƴǒdžƞ Ŏ5 ýĂǕƒ ƴƱldž!ƒ ƗơǁƬdž! ββƧƙ!ƒĂ lβT!ƒ ýdžǴƵ ĆǴƞ Ü Ɵ ƒ + Ɵ ƒ +

LJŏƧƕǰ ýƙơŏ ƘǴdžǁǂ!ƒ LJdž YĂǈ!ƒ ƒƦǌ5 Ü Ǵƣ ŏD ƘǴdžǁǂ!ƒ ƴǒdžƞ Ŏ5 ŎǰǴλ!ƒ ƴƱldž!ƒ ƗơǁƬdž! ýĂƱ!ƒ

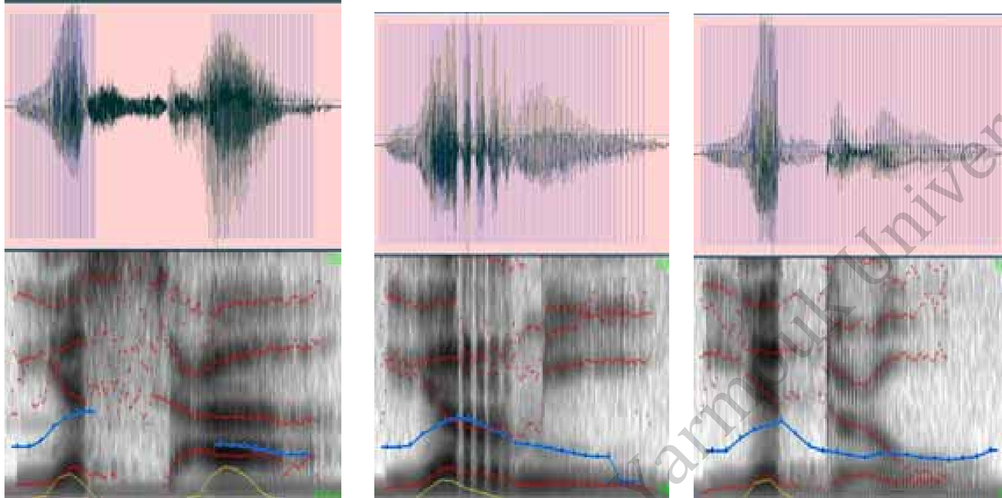
ýdžǴƺǁ! Ĭǀƕŏ ǸǈD Ǖǫ Ü lβdž!ƒ ýdžǴƺƕ ŎǰǴλ!ƒ ƨŏdžƙŏĂ Ü ββƧƙ!ƒĂ lβT!ƒ ŎǁdžǴƺƕ Ǵdžnj!ĂD ƨŏdžƙŏ ÜLJŏŏĂƥ

[illegible]

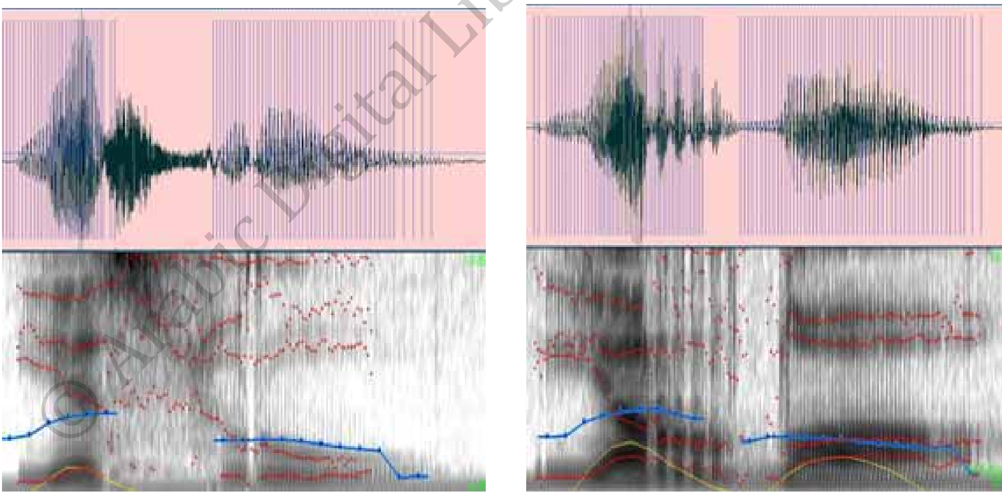
[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
158	51	260	148	51	230	161	53	201	[illegible]
176	53	274	158	54	262	179	55	261	[illegible]
167	52	267	153	53	246	170	54	231	[illegible]

[illegible]

: Ĭǀǰ ǈǂǂǭǎǆǋ ţ ƽƑǆǁǀ ƱƥƑƮǄǁǀ üyƻǁǀ ƥƓǆ



(yas c**ā** Ăyƒɛĭ)   (yar mī ĬǄƥĭ)   (yad c**ū** ǋYɋĭ)



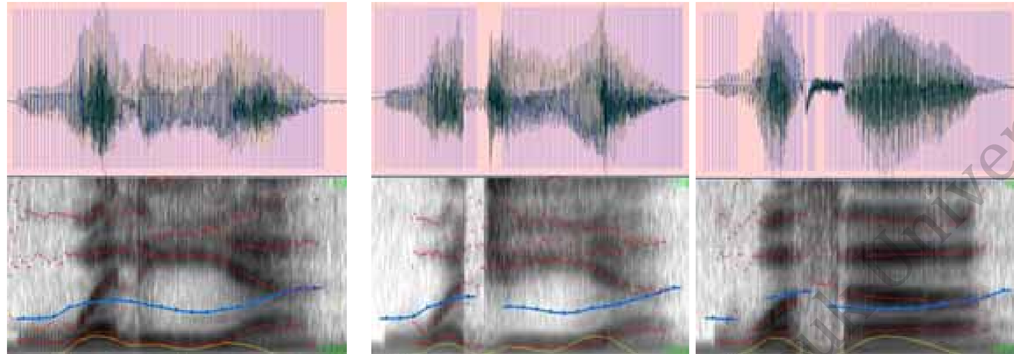
(yas r**ū** ǋƥɛĭ)   (yar **ɖā** ĂƮƥĭ)

[illegible] :

[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
109	43	448	143	49	347	[illegible]
98	46	443	150	50	413	[illegible]
115	55	476	154	50	464	[illegible]
112	53	500	161	55	412	[illegible]
109	46	408	164	51	392	[illegible]
108	49	455	144	51	405	[illegible]

[illegible]

: Ĭlj ĿǰŧƙƊǎǈNj ƼNjƥƨƊǎǁǃ ƸĭƨŧǁǃĬƮƒƊǎǁǃ üyƨǁǃ ƥƓǆ



(wa li ya ĿĬǔNj)　　(wa **ği ya** ĿĬǙNj)　　(wa fā ĂʒNj)

Ɲ Ɲ ƫ / ĬǽƒƙǁǃǗǓƨƊǎǁǃ			Ɲ ƫ / üNjǓǃǗǓƨƊǎǁǃ			
ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆǆ!ƒ	ƕƊǎŧǀǁǃ
162	52	526	159	52	233	ĂʒNj
162	52	526	159	52	233	ǕƨNjŧƊǎǁǃ

Ɲ ƫ / ƘǁƒƙǁǃǗǓƨƊǎǁǃ			Ɲ ƫ / ĬǽƒƙǁǃǗǓƨƊǎǁǃ			Ɲ ƫ / üNjǓǃǗǓƨƊǎǁǃ			
ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆǆ!ƒ	ƕƊǎŧǀǁǃ
165	52	324	147	51	236	146	50	272	ĿĬǙNj
175	52	312	146	52	263	140	51	271	ĿĬǁNj
170	52	318	147	52	250	143	51	272	ǕƨNjŧƊǎǁǃ

Ǵdžnjƶdž ýlǒĂ ŎǉĜλ!ƒ ƴdž ƧǒƤŪƒ ƴƱldž!ƒ ăĂĜʅkǒ5 lƥT!ƒ ýdžĜƵ ƒ ĂʈƤhĂ Ü ýĂŪƒ ƴƱldž!ƒ ĬǁƵ

. 51 ƴƥƒĂh ýĂŪƒ

ǴdžƥǉƵ ƽĂƧ5dž!ƒ ƻǒ5ǁ!ƒ ýƶ5!ƒ LJdž ƧǒƤŪƒ ƴƱldž!ƒ ĬǁƵ ƥƥƧk!ƒĂ lƥT!ƒĂ lƥdž!ƒ Ƨhǉ ƴlǒ NLǉ5 Ŏ!Ĝk!ĜhĂ

ƴƱldž!ƒ ĬǁƵ lƥdž Ƨhǉ ăĂpD ŎǉĜλ ƴlǒĂ Ü (Ɵ ƒ + Ɵ ƒ + Ɵ ƒ) ŎƶƱldž!ƒ NJhǒ+Ƨk LJĂ+ǒ

ǴdžD . ŎǉĜλ!ƒ ƴƱldž!ƒ ĬǁƵ ƥƥƧk ăĂpD ŎǉĜλĂ Ü ŎǉĜλ!ƒ ƴƱldž!ƒ ĬǁƵ lƥT ăĂpD ŎǉĜλĂ Ü ýĂŪƒ

. ýĂŪƒ ƴƱldž!ƒ ĬǁƵ ƴlk5 ƥƥƧkĂ lƥT ăĂpD ŎǉĜλĂ Ü ŎǉĜλ!ƒ ƴƱldž!ƒ ĬǁƵ ƴlk5 lƥdž ƻƶƜD

: Ĭlj ǉ+kDžcNj ƼNjƥƻDžǁɛ Ƹ Ĭƻ+ǁɛ ƱƥƒʈDžǁɛ üyƻǁɛ ƥĜdž

(ya lī Ĭ+ĭ)   (yaw ğā ĂɯNjĭ)   (ya fī Ĭƻĭ)

: ꝉNjƥƨDŽlle ƹ ĭƨǂlle ƱƥƑƮDŽlle üƴƨlle ƥǴǆ üĭǂƟƗ

ƝƝ ƫ / ĬǆƑƙlle ƯƯƨDŽlle			Ɲ ƫ / üNjŬɛ ƯƯƨDŽlle			
ƥƥƨƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƨƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕDŽǂƖlle
90	52	386	157	50	305	Ĭƨĭ
121	47	401	148	53	265	Ĭǂĭ
106	50	394	153	52	285	ƯƨNjƗDŽlle

ƝƝ ƫ / ĬǆƑƙlle ƯƯƨDŽlle			ƫ Ɲ ƫ / üNjŬɛ ƯƯƨDŽlle			
ƥƥƨƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƨƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕDŽǂƖlle
110	46	393	143	53	411	ĂƜNjĭ
110	46	393	143	53	411	ƯƨNjƗDŽlle

ĂƊ Ü ƟƟ ƒ + Ɵ ƒ LJǆ ƨĂƨƽǆ!ƒ ƻöƽ!ƒ ƳƨǴƣǆ!ƒ ýƻƽ! ǑƻƱƖǆ!ƒ Ɣöǂƨƙ!ƒ LJĂǂƙö

Üýƻƽ!ƒ ƒƦNj ƨƕǉ ƠǆǕǆ ƥöƥƠƙ LJƷ LJŬĂƌƪǆ!ƒ ǴǆNj ƥƥƨƙ!ƒĂ Ɩƥǆ!ƒ ǖǆǴƷĂ Ü ƟƟ ƒ + ƒ Ɵ ƒ

ăĂƙƪǆ ĬƷ (Ǒƽö) ýƻƽ!ƒ ƨƖƠ ƥƖƽ Ü (ƟƟ ƒ + Ɵ ƒ) ǑƻƱƖǆ!ƒ Njƕöǂƨƙ LJĂǂö ǴǆƥǉƷ

ýĂǕƒ ƴƱƖǆ!ƒ ƨƖƠ ýƕǴƖǆ!ƒ ǑƽĂ Ü 401 (Ǒö) ýƻƽ!ƒ ǑƽĂ Ü 386 ǑǉǴ!ƒ ƴƱƖǆ!ƒ ĬƷ ýĂƱ!ƒ

ĬƷ (Ǒƽö) ýƻƽ!ƒ ǴǴƞƽ ƥƥƨƙ!ƒ ýǆǴƷ ǴǆƊ Ü (Ǒö)ýƻƽ!ƒ Ǒƽ 265Ă (Ǒƽö) ýƻƽ!ƒ Ǒƽ 305

LJƊ LJöƠ Ǒƽ Ü 148 ƴƥƒĂƕ (Ǒö) ýƻƽ!ƒ LJǆ ýĂǕƒ ƴƱƖǆ!ƒ ĬƷĂ Ü 157 ƴƥƒĂƕ ýĂǕƒ ƴƱƖǆ!ƒ

ǴǆƊ Ü 121 ƨƖƠ (Ǒö) ýƻƽ!ƒ LJǆ ǑǉǴ!ƒ ƴƱƖǆ!ƒĂ Ü 90 ƨƖƠ (Ǒƽö) ýƻƽ!ƒ LJǆ ǑǉǴ!ƒ ƴƱƖǆ!ƒ

ýƱlďž!ƒ Ĭ꩜Ƶ 52 ýƥƒĂƜ (Ŏꞩŏ) ýƶꞩ!ƒ Ŏꞩ ƇƓƞ ƥlꞩ Ü YĂǈ!ƒ ƒȒǌ Ŏꞩ ǅꞁƓơ Ƨŏƹ Ĭ꩜ŏꞩ ǈƥT!ƒ ýďžƓƵ

53Ă ŎǉƓƛ!ƒ ýƱlďž!ƒ Ĭ꩜Ƶ 47 ýƥƒĂƜ (Ŏ꩜ŏ) ýƶꞩ!ƒ ƇƓƞĂ Ü ýĂǕƒ ýƱlďž!ƒ Ĭ꩜Ƶ 50 Ă Ü ŎǉƓƛ!ƒ

. ýĂǕƒ ýƱlďž!ƒ Ĭ꩜Ƶ

ýĂǕƒ ýƱlďž!ƒ ǇꞩÜ (θ θ ƒ + ƒ θ ƒ) ĂǋĂ ýƶꞩ!ƒ ƒȒǌ! ŎǉƓƛ!ƒ ŎƶƱlďž!ƒ Ɣŏ‡Ƨķ!ƒ ƓďžƉ

ýƱlďž!ƒ Ĭ꩜Ƶ 393 ýƜƓlďž Ŏꞩ ýĂƱ!ƒ ăĂķꞁďž Ĭ꩜Ƶ 411 ƽlơ Ȓ Ɨ ǚƛ!ƒ ƧƜǉ!ƒ ýďžƒĂƶƜ ƧƛďķꞁŏǊŏꞩ

ÜŎǉƓƛ!ƒ ýƱlďž!ƒ Ĭ꩜Ƶ 46 ýƜƓlďž Ŏꞩ ýĂǕƒ ýƱlďž!ƒ Ĭ꩜Ƶ ǈƥT!ƒ ăĂķꞁďž Ĭ꩜Ƶ 53 ƽlơĂ Ü ŎǉƓƛ!ƒ

.ŎǉƓƛ!ƒ ýƱlďž!ƒ Ĭ꩜Ƶ 110 ýƜƓlďž Ŏꞩ Ü ýĂǕƒ ýƱlďž!ƒ Ĭ꩜Ƶ ƥƥƧķ!ƒ ăĂķꞁďž Ĭ꩜Ƶ 143 ƽlơĂ

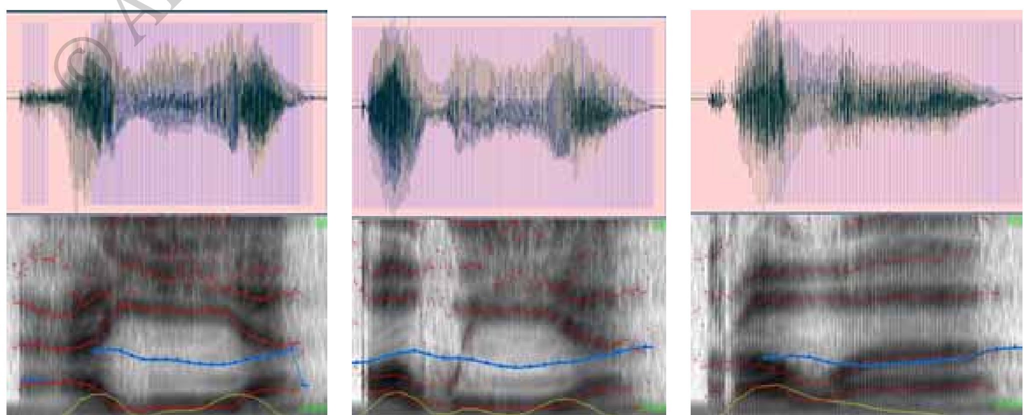
Ü (θ θ ƒ + θ ƒ) ýƱlďž!ƒ ƒȒ ƽĂƨꞩďž!ƒ ƻŏꞩ꩜!ƒ YƧƓƜďž!ƒ ýƶꞩ!ƒ ǇꞩƽƜꞁ Ɠďž Ĭ꩜Ƶ ƇƓǉƜĂ

ƧĂƥ ǁƓǉǌ Ʃŏ!Ă Ü ýĂǕƒ ǊƶƱlďž Ĭ꩜Ƶ ƥƥƧķ!ƒ ƧƜǉ ǇĂ‡ŏĂ Ü ŎǉƓƛ!ƒ ǊƶƱlďž Ĭ꩜Ƶ ǈƥďž!ƒ ƧƜǉ ǇĂ‡ŏ

Ĭ꩜Ƶ ƥƥƧķ!ƒĂ ǈƥT!ƒĂ ǈƥďž!ƒ ƧƜǉ ǇĂ‡ŏꞩ Ü(θ θ ƒ + ƒ θ ƒ) ýƱlďž!ƒ ƓďžƉ Ü Ǌŏꞩ ǈƥT꩜!

.ýĂǕƒ ǊƶƱlďž

: Ĭǉ Ǉǂķƌǌ ǅǌƥƽǅǁ ƹĭƻǁ Ĭ ƮƑǅǁ üƴƻǁ ƥƓďž



(ca yi ya ĬĭY) (qa wi ya ăǋꞩ) (ra wā ǌǋƥ)

[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
159	51	397	166	55	245	[illegible]

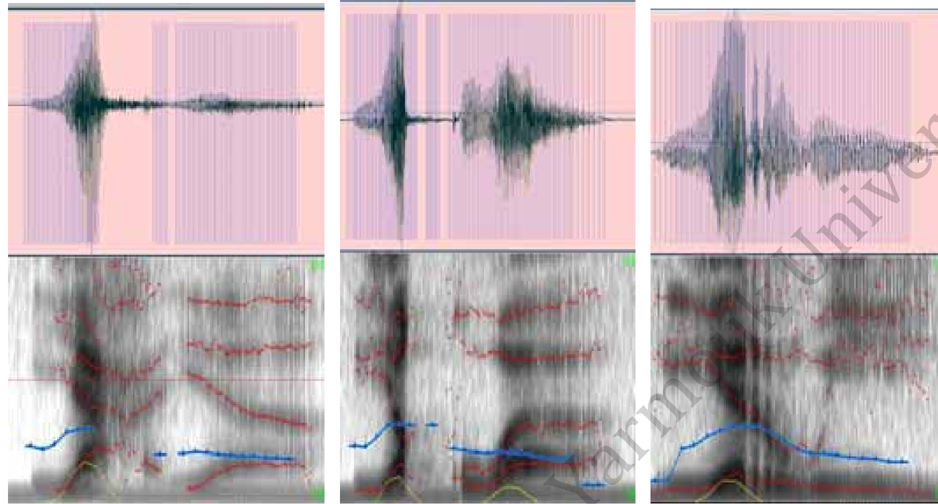
[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
171	52	282	159	52	263	172	54	209	[illegible]
157	53	317	163	51	261	151	52	349	[illegible]
164	53	300	161	52	262	166	53	279	[illegible]

[illegible] :

[illegible]

[illegible]

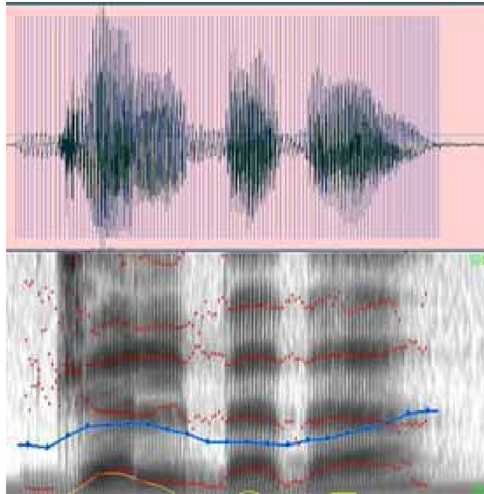
: Ĭlj ǈǂǁǎǈǋ ǄǎǋǷǂǄǎǁ Ʃ ĭƻǂǁ ƱǷƑƮǄǎǁ üyƻǁ ǷǤǎ



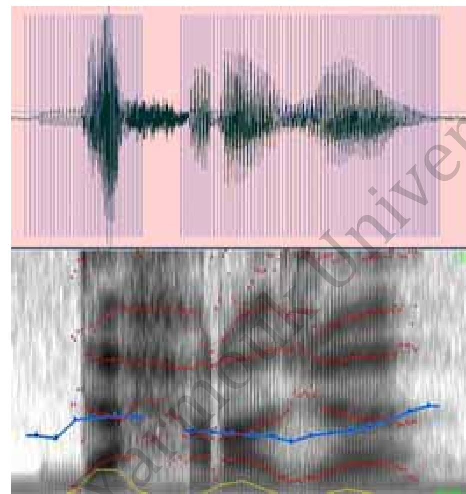
(yac y**ā** ƒĭyĭ)   (yaq w**ā** ǌǋǂĭ)   (yar w**ī** ăǋǷĭ)

ƝƝ ƫ / ĬǆƑǁ ƯƯǂǄǎǁ			ƫ Ɲ ƫ / üǋǓǁ ƯƯǂǄǎǁ			
<u>ǷǷƧǩ!ƒ</u>	<u>ǉǷT!ƒ</u>	<u>ǉǷǆ!ƒ</u>	<u>ǷǷƧǩ!ƒ</u>	<u>ǉǷT!ƒ</u>	<u>ǉǷǆ!ƒ</u>	ƕǄǂǀǁ
109	44	361	140	50	393	ăǋǷĭ
106	49	447	153	50	344	ǌǋǂĭ
113	40	482	147	52	421	Ăĭyĭ
109	44	430	147	51	386	ƯƨǋǂǄǁ

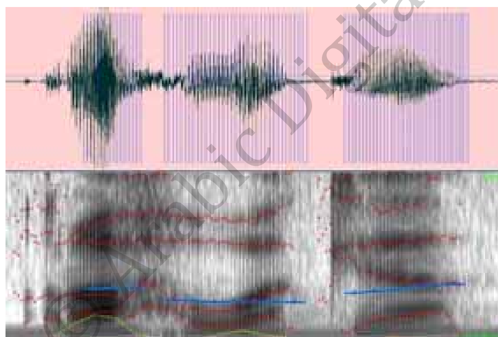
: Ĭǉ ǈǰǂǩǍǎǋ ǫƥǚǍǁǋ ĬYǒǴƥǁǋ ĬȚǒǍǁǋ üyƧǁǋ ƥǴǜ



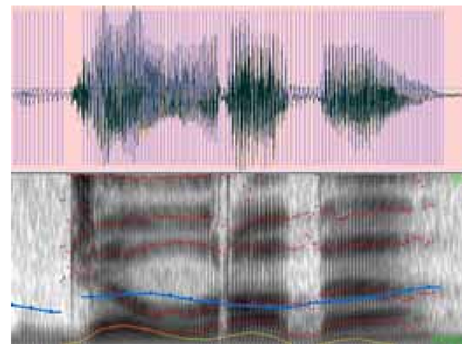
(**ǧ**al ba ba ƒǴǂǚ)



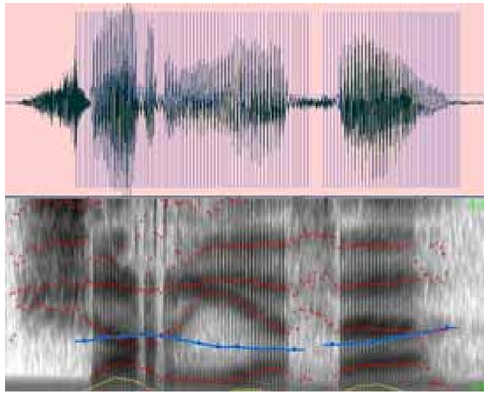
(daḥ ra **ǧ**a ƚƥɵǫ)



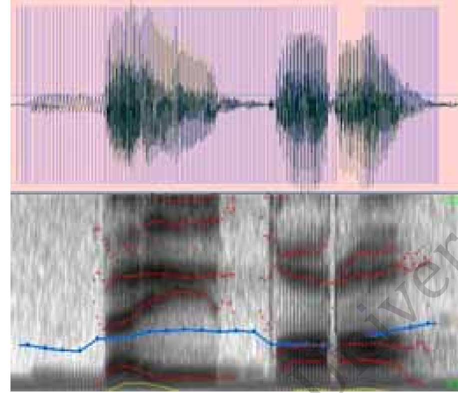
(rah wa ka ƿǋǉƥ)



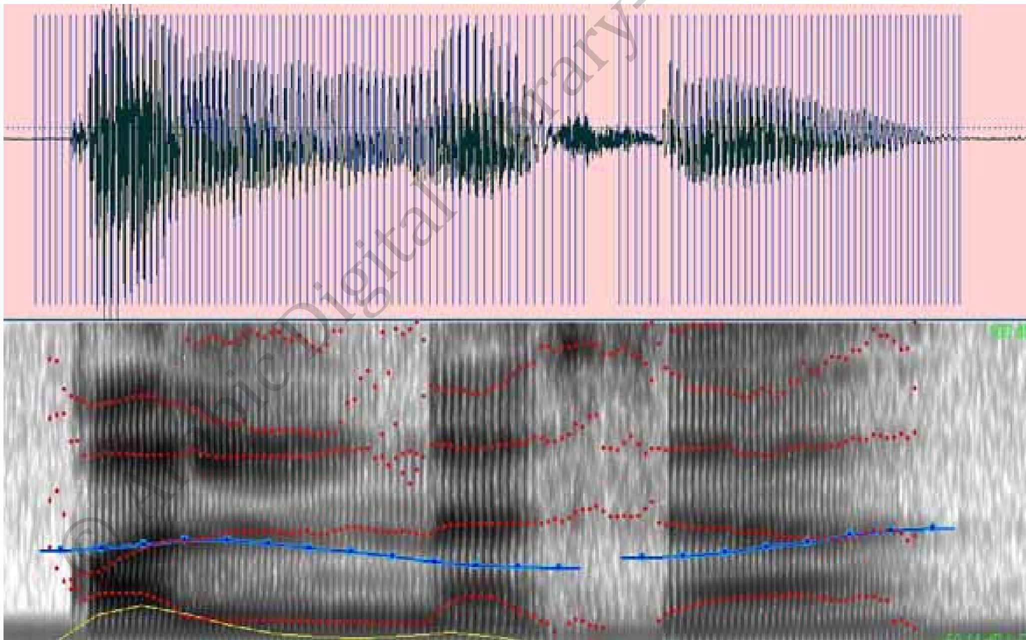
(**ǧ**aw ra ba ƒƥǋǚ)



(ŝar ya fa ƹĭƥƪ)



(bay ṭa ra ƥŬĩƓ)



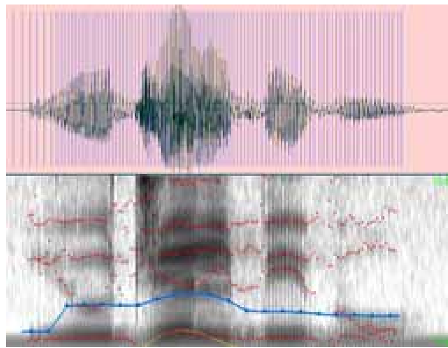
(qal na sa Ƨǿǂ)

: [illegible]

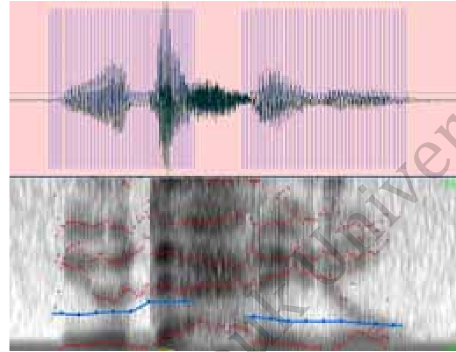
[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
155	48	304	142	51	175	160	51	317	[illegible]
154	48	282	127	50	117	155	51	402	[illegible]
161	49	239	133	51	234	145	52	354	[illegible]
163	47	267	127	49	298	165	53	286	[illegible]
157	47	249	133	49	152	161	50	508	[illegible]
161	49	248	137	48	303	159	50	341	[illegible]
164	45	318	137	50	168	169	53	336	[illegible]
159	48	272	134	50	207	159	51	363	[illegible]

[illegible]

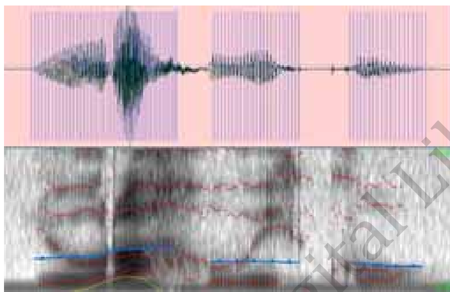
: Ĭlj LjĦķĎžČŃj ɋþШĎžƚ ĬYƑǴþƚ ƱþƑƮĎžƚ üyƻƚ þǴǆ



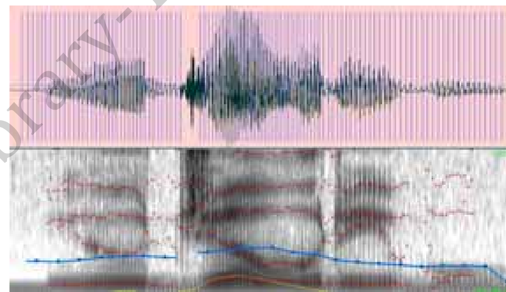
(yu **ğ**al bi bu ƒǴĦШĭ)



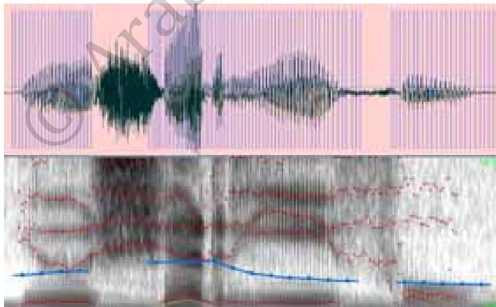
(yu da**ḥ** ri **ğ**u łþθɋĭ)



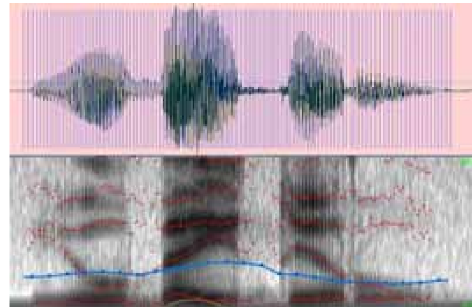
(yu rah wi ku þŃljþĭ)



(yu **ğ**aw ri bu ƒþŃШĭ)



(yu **ŝ**ar yi fu ƹĭþƪĭ)



(yu bay **ṭ**i ru þƯĭǴĭ)

(yu qal ni su ƨďǂşĭ)

: ϙϸШDžǁǁ ĬYƑĜϸǁǁ ƱϸƒƮDžǁǁ üƴƧǁǁ ϸĜǆ üĭǂΘł

ΌĜέϸǁǁ ΌƯşDžǁǁ Ɲ ƫ			ƘǁƑƙǁǁ ΌƯşDžǁǁ Ɲ ƫ			ĬǆƑƙǁǁ ΌƯşDžǁǁ ƫ Ɲ ƫ			üNjŬǁǁ ΌƯşDžǁǁ Ɲ ƫ			
ϸϸƧƙ!ƒ	ƚϸT!ƒ	ƚϸdž!ƒ	ϸϸƧƙ!ƒ	ƚϸT!ƒ	ƚϸdž!ƒ	ϸϸƧƙ!ƒ	ƚϸT!ƒ	ƚϸdž!ƒ	ϸϸƧƙ!ƒ	ƚϸT!ƒ	ƚϸdž!ƒ	ƕDžǂǀǁǁ
107	38	157	114	43	150	155	48	228	134	46	222	ǂϸΘϙĭ
110	40	139	118	47	151	153	52	263	116	47	245	ƚƒĜǂШĭ
108	39	137	121	48	188	161	53	257	133	48	249	ƚƒϸNjШĭ
109	41	163	121	44	293	165	52	204	138	50	203	ϸNjǉϸĭ
98	41	184	125	48	158	164	51	273	138	47	267	ϸƯĭĜĭ
108	40	178	124	48	182	146	51	315	141	47	207	ǅƩĭϸƪĭ
105	40	182	123	50	189	159	53	285	145	47	275	ǂƧďǂşĭ
106	40	163	121	47	187	158	51	261	135	47	238	ƯƨNjǂDžǁǁ

- üyƻǁǁɛ ƮƑDžǁǁɛ Ǐ ƮƑDžǁǁɛ üƑƙDžǁǁɛ :

. ƚ !ƓƛƒƒyƱldž!ƒ ǏƵ ƥƥƨƙǈ! ƨhlj ăĂpÐ yƖŏĂ Ü ýĂǕƒ yƱldž!ƒ ǏƵ ƚƥT!ƒĂ ƚƥdžǈ! ƨhlj ăĂpÐ yƖŏ

- üyƻǁǁɛ ƮƑDžǁǁɛ ƱƥƑ üƑƙDžǁǁɛ :

+ Ɵ ƒ + Ɵ ƒ) ǇŏhŏƗƨƙ!ƒ Ŏ5 Ü ýĂǕƒ yƱldž!ƒ ǏƵ ƥƥƨƙ!ƒĂ ƚƥT!ƒĂ ƚƥdž!ƒ ƨhlj yƖŏ

. (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ) Ă (Ɵ ƒ

- üyƻǁǁɛ ƮƑDžǁǁɛ Ǐ ƸǊƜŬɛ :

(Ɵ ƒ + Ɵ Ɵ ƒ) ǇŏhŏƗƨƙ!ƒ Ŏ5 Ü ýĂǕƒ yƱldž!ƒ ǏƵ ƥƥƨƙ!ƒĂ ƚƥT!ƒĂ ƚƥdž!ƒ ƨhlj yƖŏ

. (Ɵ ƒ + Ɵ ƒ + Ɵ ƒ) Ă

- üyƻǁǁɛ ƮƑDžǁǁɛ ƱƥƑ ƸǊƜŬɛ :

. ýĂǕƒ yƱldž!ƒ ǏƵ ƥƥƨƙ!ƒĂ ƚƥT!ƒĂ ƚƥdž!ƒ ƨhlj yƖŏ

- üyƻǁǁɛ ƮƑDžǁǁɛ Ǐ ƫ ƼƑdžǁɛ :

ƚƥdž ƒƨĂhljdž Ü Ɵ ƒ + Ɵ ƒ + Ɵ ƒ ŎƶƱldž!ƒ ƔŏƗƨƙ!ƒ ĂƦ ƒ pƓlj!ƒ Ŏư Ɠdž!ƒ ýƶƨ!ƒ ǇĂƗŏ

ǊƶƱldž ǏƵ ƥƥƨƙ ƨhlj ƒƨĂhljdžĂ Ü ýĂǕƒ ǊƶƱldž ǏƵ ƚƥT ƨhlj ƒƨĂhljdž ǇĂƗŏĂ Ü ƚ !ƓƛƒƒǊƶƱldž ǏƵ

. ƚ !Ɠƛƒƒ

ƚƥT ƨhljĂ Ü ŎljƓƛƒƒyƱldž!ƒ ǏƵ ƚƥdž ƨhlj ƒƨĂhljdž ǇĂƗŏ5 Ü Ɵ Ɵ ƒ + Ɵ ƒ ƔŏƗƨƙ!ƒ ƓdžÐ

. ýĂǕƒ yƱldž!ƒ ǏƵ ƥƥƨƙĂ

. ǈƱŏƬƙǂ Ü " ýŏƶƽƙ " : ƚ !ƓƛƒƒƑ

. ƔƧĂƞƙǂ Ü " ýƵĂƽƙ " : ƴƒƧ!ƒ

. ǈǂƪďƙǂ Ü " ýƶƽďƙ " : Ʃ ďƓƤ!ƒ

. Ĭ ǀƪƙǂ " Ĭ ƶƽƙ " : Ʃ ƥƓƪ!ƒ

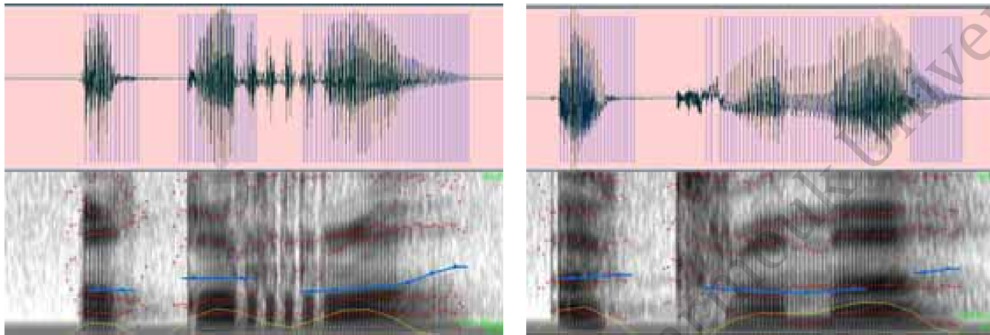
: ǈƓǉƨĂ Ǌ! Ü ǈƓƼƧơ Ǌŏƽ ƥŏƨ Ɠďƶƶ ƫơďƶ!ƒĂ

. Ʃ ƪǉƶƿƓǂ Ü " ýǉƶƼƒ " : ýĂǛƒ

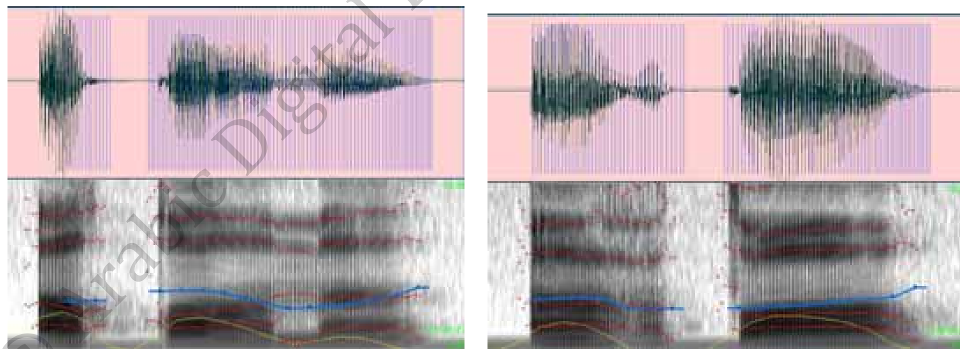
(1) ". Ĭ ǀǉƪƓǂ " Ĭ ǉƶƼƒ " : Ŏǉƛ!ƒ

: Ăǁǁ !ƨ ƽĭǋ Û ƹ ƥƟǴ ǫĭƦǅǁǁ Ĭ Ʈ ǅǁǁ üyƧǁǁ ƥǴǚ : Ǘǋǈ

: Ĭ ǉ ǇǂǂǅǇ Û ƔƦǅǋǁǁǴ ǫĭƦǅǁǁ Ĭ Ʈ ǅǁǁ üyƧǁǁ (ǈ



('a qar ra ƥƽǈ)　　('ak ra ma !ƥǀǈ)



('a qā ma !ƑƽǈÏ)　　('ac ṭā ĂƯƳǈ)

('ā ma na DžDŽC)

ƘǁƑǁƐ ƱƯƨDŽǁƐ			ǏdžƑǁƐ ƱƯƨDŽǁƐ			üNjǓƐ ƱƯƨDŽǁƐ			
ƥƥƧǩ!ƒ	ǉƥT!ƒ	ǉƥdž!ƒ	ƥƥƧǩ!ƒ	ǉƥT!ƒ	ǉƥdž!ƒ	ƥƥƧǩ!ƒ	ǉƥT!ƒ	ǉƥdž!ƒ	ƕDŽǂǀǁƐ
177	57	284	147	55	131	187	53	268	!ƥǀƈ
168	52	208	170	57	287	160	57	221	!ƑƼƈ
166	51	287	142	55	226	190	59	256	DžDŽC
181	55	213	178	56	244	155	52	180	ƥƼƈ
			155	57	384	166	54	307	ĂƯYƈ

ýǂT!ƒ ǴdžD Ü ǂőƨƱǀdž ýǴǂTD ǂǩƪ ǇdžǀƨdžnjǴ ƥőƨdž!ƒ Ŏưǵdž!ƒ ýƨƽǁ! ŎƨƱǀdž!ƒ ƔŏǂƧǩ!ƒ ǇĂǂǩŏ

ýƱǀdž!ƒ ǏǁƵ ǉƥdž!ƒ ƧǉǈĴ ƨǀơǩőƼ (DžƧǂD) ýƨƽ!ƒ NǉǍdžőĂ (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ) ýĂǛƒ

: [illegible] (f

(Wā lā [illegible])

('ā xa ᵈa [illegible])

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
158	53	289	117	55	239	194	57	285	[illegible]
			157	53	471	160	55	444	[illegible]

: [illegible]

[illegible] ([illegible]) [illegible] (θ f + θ f + θ θ f) [illegible]

[illegible]

. [illegible]

ƴƱǀǆž!ƒ ǏǈƵ ƖɓǆǄ! ƧƕǉǍ ýǍƱǷ ƨǀơƙǒ5 (Ǐ!ƒǍ) ýƶ5!ƒ ǋǈǍǆǒǍ (Ɵ ƒ + Ɵ Ɵ ƒ) ǑǈǦǍ!ƒ

ƧƕǉǍ ǏǈƵǷ ƨǀơƙǒǍ Ü ǑǈǦǍ!ƒ ǋǒǈǒ ýǍǕ̄ƒ ƴƱǀǆž!ƒ ǏǈƵ ƖɓTǄ! ƧƕǉǍ ǎǍpǷ ƨǀơƙǒǍ Ü ýǍǕ̄ƒ ǋǒǈǒ ǑǈǦǍ!ƒ

. ǑǈǦǍ!ƒ ǋǒǈǒ ýǍǕ̄ƒ ƴƱǀǆž!ƒ ǏǈƵ ɓɓƧƙǄ!

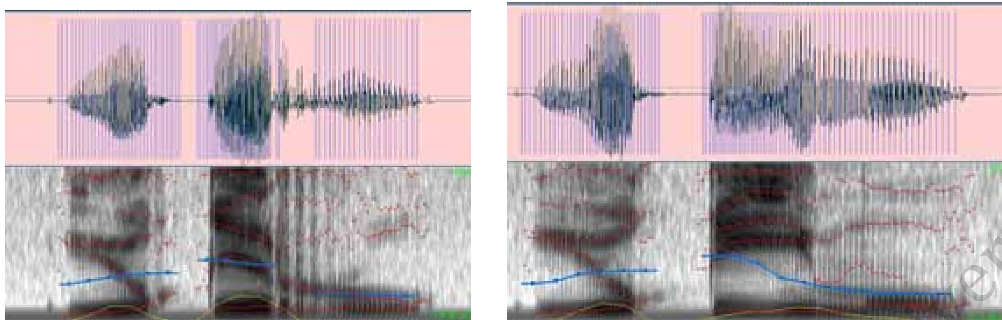
: Ǐǉ ǈǂƙǆǈǋ ƸǐƴƮǂǁƑǴ ơǐŘǆǁƐ Ǐ ƮƑǆǁƐ üƴƶǁƐ (ƚ

(Zak kā ĂǚŘ) (Far ra ḥa Ɲɓʒ)

ƘǁƑƙǁƐ ƲƯƨƊǁƐ			ǏǆƑƙǁƐ ƲƯƨƊǁƐ			üǋǓƐ ƲƯƨƊǁƐ			
ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓǆž!ƒ	ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓǆž!ƒ	ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓǆž!ƒ	ƕƲǇǂǀǁƐ
183	53	280	142	55	190	199	56	310	Ɲɓʒ
			156	55	420	158	52	482	ĂǚŘ

(Yuc t̲ī)

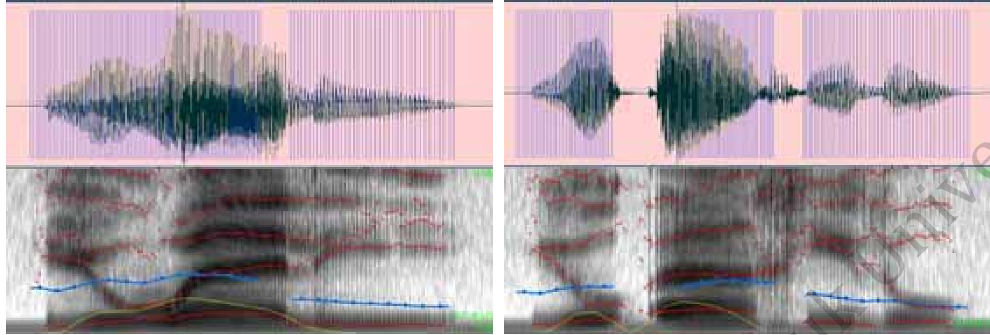
(Yuk ri mu)



(Yu qir ru ƥƨǂ)　　　　(Yu qī mu !ǐƨǂ)

ƘǁƒƙǁƐ ƲƲƨƌǁƐ			ǏǆƒƙǁƐ ƲƲƨƌǁƐ			üǋǓƐ ƲƲƨƌǁƐ			
ƥƥƧƙ!ƒ	ƖƥƬ!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥƬ!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥƬ!ƒ	Ɩƥǆ!ƒ	ƕǅǂǂƐ
103	47	184	117	53	165	206	51	315	!ƥǀǂ
107	50	255	181	51	278	157	52	227	!ǐƨǂ
103	47	219	202	55	270	155	51	255	ƥƨǂ
			114	47	290	181	54	281	ǏǁǋǂǏ

[illegible] (



(Yu wā lī [illegible])　　　　(Yu 'ā xi ḏu [illegible])

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
102	46	208	121	46	244	165	56	373	145	53	233	[illegible]
			100	48	315	170	57	242	150	55	219	[illegible]

: [illegible]

[illegible] (θ f + θ f + θθ f + θ f) [illegible]

[illegible]

[illegible]

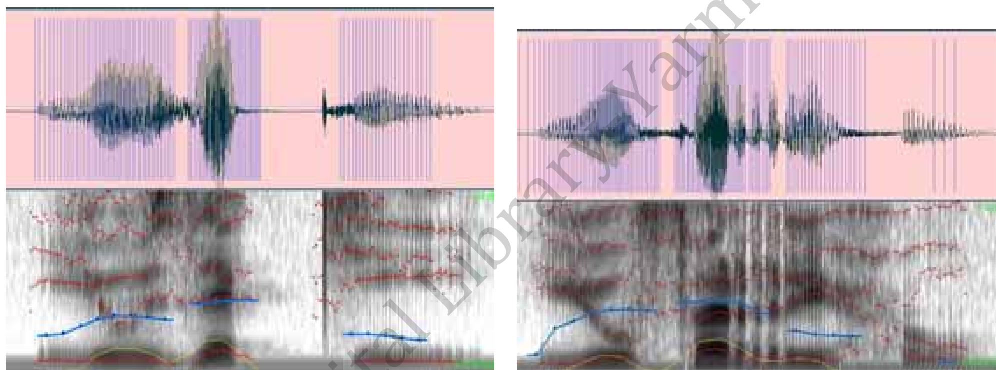
. ÿƒϨ!ƒ ƒϨŏƤĂ Ɨ!ǴƛƒNǒǐŏĂ ýĂŪƒ Nǒǐŏ ŎǉǴƛ!ƒ ÿƱǀdž!ƒ

ǀþdž!! Ϩǉ ýĂƱ ƽǀơǩŏ5 (Ŏ!ƒĂŏ) ýƶ5!ƒ NǃdžŏĂ (Ɵ Ɵ ƒ + Ɵ Ɵ ƒ + Ɵ ƒ) ŎǉǴƛ!ƒ

Nǒǐŏ ŎǉǴƛ!ƒ ÿƱǀdž!ƒ ǏǐƵ ǀþT!! Ϩǉ ăĂp ƽǀơǩĂ Ü ýĂŪƒ ƒϨŏƤĂ ŎǉǴƛ!ƒ Nǒǐŏ Ɨ!Ǵƛ!ƒ ÿƱǀdž!ƒ ǏǐƵ

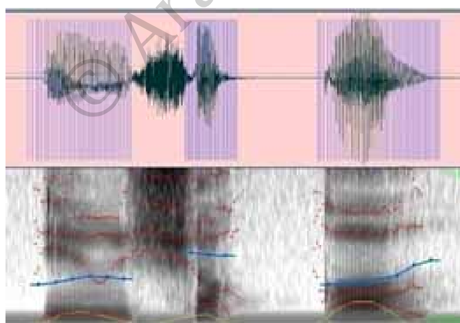
. Ɨ!Ǵƛ!ƒ ƒϨŏƤĂ ýĂŪƒ Nǒǐŏ ŎǉǴƛ!ƒ ÿƱǀdž!ƒ ǏǐƵ þþϨǩ!! Ϩǉ ǏǐƵ ƽǀơǩĂ Ü Ɨ!Ǵƛ!ƒ ƒϨŏƤĂ ýĂŪƒ

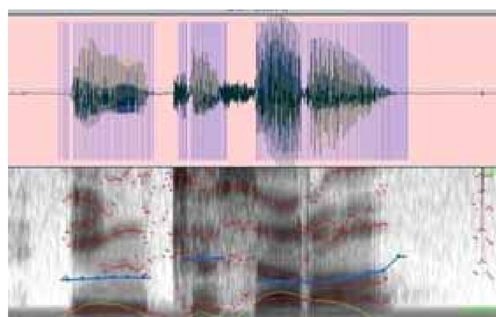
: Ǐǉ ǇǂǩDžǋ ƹǐÿƮǂǦ ǭǐƦDžǁ Ʊþƒ ƮDžǁ üÿƵǁ þǴ (Ɨ



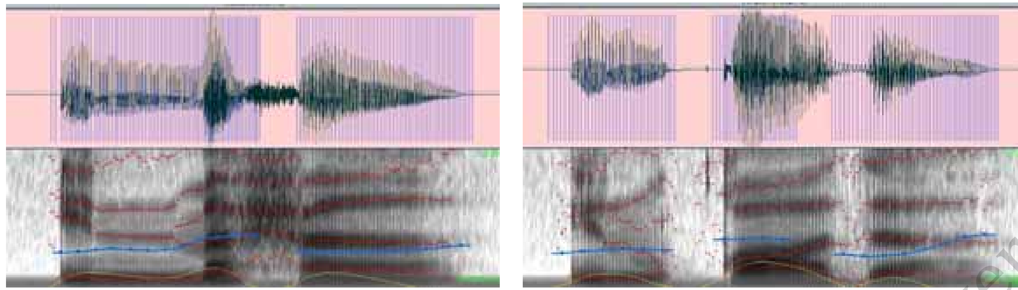
(Yu zak kĪ ǏǂƦǐ) (Yu far ri ḥu Ɲþƶǐ)

ƯǴþǁ ƯƯƽDžǁ			ƘǂƑǁ ƯƯƽDžǁ			ǏǆƑǁ ƯƯƽDžǁ			üǋǗ ƯƯƽDžǁ			
þþϨǩ!ƒ	ǀþT!ƒ	ǀþdž!ƒ	þþϨǩ!ƒ	ǀþT!ƒ	ǀþdž!ƒ	þþϨǩ!ƒ	ǀþT!ƒ	ǀþdž!ƒ	þþϨǩ!ƒ	ǀþT!ƒ	ǀþdž!ƒ	ƕDžǂǁ
99	42	229	135	50	178	196	56	264	164	50	213	Ɲþƶǐ
			111	46	344	203	53	331	139	53	313	ǏǀƦǐ





('in ŝaq qa)　　　　('in ka sa ra)



('in ma ha ĂΘĎǮǘƐ)　　　　　　('in qā da ǫƑƨǘƐ)

ƲǴƐþǁƐ ƲƲ'ƨĎǮǁƐ			ƘǁƑƙǁƐ ƲƲ'ƨĎǮǁƐ			ǏǘƑƙǁƐ ƲƲ'ƨĎǮǁƐ			üǇŬƐ ƲƲ'ƨĎǮǁƐ			
þþƧƙ!ƒ	ǉþT!ƒ	ǉþǆ!ƒ	þþƧƙ!ƒ	ǉþT!ƒ	ǉþǆ!ƒ	þþƧƙ!ƒ	ǉþT!ƒ	ǉþǆ!ƒ	þþƧƙ!ƒ	ǉþT!ƒ	ǉþǆ!ƒ	ƕĎǮǂǀǁƐ
151	54	203	143	57	172	209	51	147	152	53	269	þƨǀǘƐ
			168	54	207	209	49	430	157	52	307	ƃʅǘƐ
			162	50	202	176	55	350	150	53	231	ǫƑƨǘƐ
			148	52	455	198	56	98	153	54	352	ĂΘĎǮǘƐ

: ƗŏǃǴƙ!ƒ ýǴǂTŰƒ ǇǆǉǇĂǉ!ƒĂ ƻ!ŰǴƕ þŏƨǆ!ƒ Ŏƣ'Ǵǆ!ƒ ýƶƽǃ! ŎƶƱǀǆ!ƒ Ɣŏǂƻƙ!ƒ ǇĂǂƙŏ

ýĂƱĎ ƨǀơƙŏƽ (ƧʅǂǇƒ) ýƶƽ!ƒ ǊǃǕǆŏĂ (Θ ƒ + Θ ƒ + Θ ƒ + ƒ Θ ƒ) ýĂŰƒ

ǉþTǃ! ƧƕǇ ăĂƿĎ ƨǀơƙŏĂ Ü ƚ!ǴƛƒƧŏƤĎĂ ŎǇǴƛ!ƒ ǊŏǃŏĂ yƕƒƧ!ƒ Ǌŏǃŏ Ü ýĂŰƒ yƱǀǆ!ƒ ǏǃƵ ǉþǆǃ! ƧƕǇ

ǏǃƵ þþƧƙǃ! ƧƕǇ ǏǃƵĎ ƨǀơƙŏĂ Ü ŎǇǴƛ!ƒ ƒƧŏƤĎĂ ýĂŰƒ ǊŏǃŏĂ yƕƒƧ!ƒ Ǌŏǃŏ Ü ƚ!ǴƛƒyƱǀǆ!ƒ ǏǃƵ

. ƚ!ǴƛƒƒƧŏƤĎĂ yƕƒƧ!ƒ ǊŏǃŏĂ ýĂŰƒ Ǌŏǃŏ ÜŎǇǴƛ!ƒ yƱǀǆ!ƒ

[illegible]

[illegible]

[illegible]

[illegible]

('iŝ taq qa [illegible])

('iğ ta ma ca [illegible])

('id da cā ĂYơĪ)   ('ix tā ra þƑĦƆĪ)

ƯĜĪþŀĪ ƯƯƨƊžŀĪ			ƘŀƑƙŀĪ ƯƯƨƊžŀĪ			ĬǆƑƙŀĪ ƯƯƨƊžŀĪ			üŊƯĪ ƯƯƨƊžŀĪ			
þþƧƙ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧƙ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧƙ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧƙ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	ƕƊŽŧŀŀĪ
179	51	242	124	56	152	187	56	191	137	49	337	ƯƊŽĦƜĪ
			154	52	266	198	49	305	137	48	346	ƃŀƪĪ
			172	50	251	193	54	318	164	50	302	þƑĦƆĪ
			145	50	437	186	58	148	139	51	326	ĂYơĪ

: ŧő!Ĝƙ!ƒ ýĜŧTŰƒ ǇǆƇĜƙ!ƒĂ ƖƨǆŋĜƕ þőƨǆ!ƒ Ǒ ƜĜǆ!ƒ ýƶƼ!! ǑƶƱŀǆ!ƒ Ɣőŧ Ƨƙ!ƒ ǇĂŧƙő

ƨŀơƙőƽ (ýǆƙƞƒ) ýƶƽ!ƒ ŊƊǆőĂ (ɵ ƒ + ɵ ƒ + ɵ ƒ + ƒ ɵ ƒ) ýĂŰƒ

Ƨƕǉ ăĂƿƊ ƨŀơƙőĂ Ü ŧ!ĜƛƒƒƧőƤƊĂ ǑǉĜƛ!ƒ ŊőŀőĂ ýƕƒƧ!ƒ Ŋőŀő Ü ýĂŰƒ ýƱŀǆ!ƒ ĬŀƵ Ɩþǆŀ! Ƨƕǉ ýĂƱƊ

þþƧƙŀ! Ƨƕǉ ĬŀƵƊ ƨŀơƙőĂ Ü ýĂŰƒ ƒƧőƤƊĂ ýƕƒƧ!ƒ Ŋőŀő Ü ĂĜƪƙƕ ŧ!ĜƛƒĂ ǑǉĜƛ!ƒ ýƱŀǆ!ƒ ĬŀƵ ƖþTŀ!

. ŧ!Ĝƛ!ƒ ƒƧőƤƊĂ ýĂŰƒ ŊőŀőĂ ýƕƒƧ!ƒ Ŋőŀő Ü ŧ!Ĝƛ!ƒ ýƱŀǆ!ƒ ĬŀƵ

ƧƼǉ ýǍƱƉ ƽǀơǨǒƼ (ƽǨƬƒ) ýƺƼ!ƒ ǋǛǍǆǒǍ (Ɵ ƒ + ƒ Ɵ ƒ + ƒ Ɵ ƒ) ǑǇǤǍ!ƒ

ƴƱǀǆ!ƒ ǏƷ ǇƥƬ! ƧƼǉ ǎǍƿƉ ƽǀơǨǒǍ Ü Ƚ!ǤǍ!ƒ ƒƧǒƤƉǍ ǑǇǤǍ!ƒ ǋǒǜǒ Ü ýǍǕƒ ƴƱǀǆ!ƒ ǏƷ ǇƥǆǛ!

Ƚ!ǤǍ!ƒ ǋǒǜǒ Ü ǑǇǤǍ!ƒ ƴƱǀǆ!ƒ ǏƷ ƥƥƧǨ! ƧƼǉ ǏƷƉ ƽǀơǨǒǍ Ü ýǍǕƒ ƒƧǒƤƉǍ ǑǇǤǍ!ƒ ǋǒǜǒ Ü Ƚ!ǤǍ!ƒ

. ýǍǕƒ ƒƧǒƤƉǍ

ƧƼǉ ýǍƱƉ ƽǀơǨǒƼ (ƧǤǨƤƒ) ýƺƼ!ƒ ǋǛǍǆǒǍ (Ɵ ƒ + Ɵ Ɵ ƒ + ƒ Ɵ ƒ) Ƚ!ǤǍ!ƒ

ƴƱǀǆ!ƒ ǏƷ ǇƥƬ! ƧƼǉ ǎǍƿƉ ƽǀơǨǒǍ Ü Ƚ!ǤǍ!ƒ ƒƧǒƤƉǍ ýǍǕƒ ǋǒǜǒ Ü ǑǇǤǍ!ƒ ƴƱǀǆ!ƒ ǏƷ ǇƥǆǛ!

Ƚ!ǤǍ!ƒ ǋǒǜǒ ǑǇǤǍ!ƒ ƴƱǀǆ!ƒ ǏƷ ƥƥƧǨ! ƧƼǉ ǏƷƉ ƽǀơǨǒǍ Ü ǍǤƪǨ Ƚ!ǤǍ!ƒǍ ýǍǕƒ ǋǒǜǒ Ü ǑǇǤǍ!ƒ

. ýǍǕƒ ƒƧǒƤƉǍ

ƧƼǉ ýǍƱƉ ƽǀơǨǒƼ (ǏƷƥƒ) ýƺƼ!ƒ ǋǛǍǆǒǍ (Ɵ Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ) ƴǜƒƧ!ƒ

ƴƱǀǆ!ƒ ǏƷ ǇƥƬ! ƧƼǉ ǎǍƿƉ ƽǀơǨǒǍ Ü ǑǇǤǍ!ƒ ƒƧǒƤƉǍ ýǍǕƒ ǋǒǜǒ Ü Ƚ!ǤǍ!ƒ ƴƱǀǆ!ƒ ǏƷ ǇƥǆǛ!

Ƚ!ǤǍ!ƒ ǋǒǜǒ Ü ǑǇǤǍ!ƒ ƴƱǀǆ!ƒ ǏƷ ƥƥƧǨ! ƧƼǉ ǏƷƉ ƽǀơǨǒǍ Ü Ƚ!ǤǍ!ƒ ƒƧǒƤƉǍ ýǍǕƒ ǋǒǜǒ ÜǑǇǤǍ!ƒ

. ýǍǕƒ ƒƧǒƤƉǍ

: Ǌǉǰ ǇǁǁƑǨƊǏǊǰ !ǘǁƐ ƸǐƴƮƗǊǰ ƸǁǓƑǴ ǬǏƦƊǏǁƐ ǏƮƑƊǏǁƐ üƴƻǁƐ (Ƚ

('iḥ mar ra ƥƊǏƟƐ)

ƘǁƑǁǁƐ ƯƲƾƉƵǁƐ			Ǐ ǆƑǁƐ ƯƲƾƉƵǁƐ			üŊǗƐ ƯƲƾƉƵǁƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆƵ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆƵ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆƵ!ƒ	ƕƊŽǂǀǁƐ
165	51	214	178	54	266	145	50	248	ĉƥƊŽƟƐ

ƒ) : Ŏ!Ǥƙ!ƒ ý ǂT!ƒ ǇǆƵ ƉǓů!ƒ ƻǒƶưƙǍ ƻ!ŰǤƕ ƥǒƨǆƵ!ƒ Ŏư ǤƵ!ƒ ýƶƽǁ! ŎƷƱǀǆƵ!ƒ ƔǒǂƧƙ!ƒ ǇǍǂƙǒ

ǏǁƵ ƖƥǆƵǁ! ƧƕǈǇ ýǍƱƊ ƾǀơƙǒƽ (ƦǆƵơƒ) ýƶƽ!ƒ ǋǁƛǆǒǍ (Ɵ ƒ + ƒ Ɵ ƒ + ƒ Ɵ

ýǍŰƒ ǋǒǁǒ ŎǈǤƛ!ƒ ƴƱǀǆƵ!ƒ ǏǁƵ ƖƥT!ǁ ƧƕǈǇ ǎǍƥƊ ƾǀơƙǒǍ Ü ƚ !Ǥƛ!ƒ ƒƧǒƤƊǍ ýǍŰƒ ǋǒǁǒ ŎǈǤƛ!ƒ ƴƱǀǆƵ!ƒ

. ƚ !Ǥƛ!ƒ ƒƧǒƤƊǍ ýǍŰƒ ǋǒǁǒ ŎǈǤƛ!ƒ ƴƱǀǆƵ!ƒ ǏǁƵ ƥƥƧƙǁ! ƧƕǈǇ ǏǁƵƊ ƾǀơƙǒǍ Ü ƚ !Ǥƛ!ƒ ƒƧǒƤƊǍ

: Ǐǈ ǇǂƙƊŽǆŊ ƊŽǓƴǁƐ Ƹ ǓƴƮǂŊ ƅƑǂǁƑǤ ƍǏƦƊŽǁƐ Ǐ ƮƑƊŽǁƐ üƴƧǁƐ (ƍ

(Ta zak kā ǍǂƦǂ)   (Ta cal la ma !ǂƴǂ)

ƯǦƐƥǁƐ ƯƯƨƉǆǁƐ			ƘǁƒƘǁƐ ƯƯƨƉǆǁƐ			ǏǆƒƘǁƐ ƯƯƨƉǆǁƐ			ǗƝǰƐ ƯƯƨƉǆǁƐ			
ƥƥƧƘ!ƒ	ƖƥT!ƒ	ƖƥǆǄ!ƒ	ƥƥƧƘ!ƒ	ƖƥT!ƒ	ƖƥǆǄ!ƒ	ƥƥƧƘ!ƒ	ƖƥT!ƒ	ƖƥǆǄ!ƒ	ƥƥƧƘ!ƒ	ƖƥT!ƒ	ƖƥǆǄ!ƒ	ǊǅǂǁƐ
152	50	186	137	54	149	183	56	224	169	56	128	!ǂyȾ
			152	52	401	191	51	296	150	53	146	ĂǂƦǂ

: ǇǰǂT Ǉǆž Ǉǒž!ƒ ƻǒƶƭƘĂ ƇǦƘ!Ǥ ƥǒƨǆž!ƒ Ǒƭǥǆž!ƒ ǘƶƼǁ! ǑƶƱǀǆž!ƒ Ɣǒǂ ƧƘ!ƒ ǇĂǂƘǒ

ƫǀơƘǒƼ (ǅǁƶƘ) ǘƶƼ!ƒ ǋǁƛǆǆǒĂ (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ + Ɵ ƒ) ǘĂǕƒ

ƧǈǇ ǎĂƿ ƫǀơƘǒĂ Ǖ ǘĂǕƒ ƒƧǒƤĂ ƚ!ǦƛƑ ǋǒǁǒĂ ƴǈƒƧ!ƒ ǋǒǁǒ Ǖ ǑǇǦƛ!ƒ ƴƱǀǆž!ƒ ǏǁƵ Ɩƥǆǁ! ƧǈǇ ǘĂƱ

ƥƥƧƘǁ! ƧǈǇ ǏǁƵ ƫǀơƘǒĂ Ǖ ƴǈƒƧ!ƒ ƒƧǒƤĂ ƚ!ǦƛƑ ǋǒǁǒ Ǖ ĂǦƪƘǈ ǑǇǦƛ!ƒĂ ǘĂǕƒ ƴƱǀǆž!ƒ ǏǁƵ ƖƥTǁ!

. ƚ!ǦƛƑ ƒƧǒƤĂ ƴǈƒƧ!ƒ ǋǒǁǒĂ ǘĂǕƒ ǋǒǁǒ ǕǑǇǦƛ!ƒ ƴƱǀǆž!ƒ ǏǁƵ

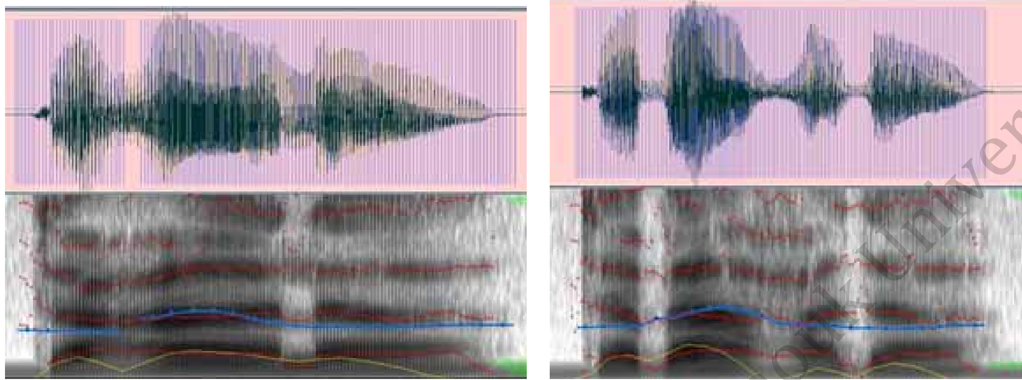
ƧǈǇ ǘĂƱ ƫǀơƘǒƼ (Ǐǂƨƙ) ǘƶƼ!ƒ ǋǁƛǆǆǒĂ (Ɵ Ɵ ƒ + ƒ Ɵ ƒ + Ɵ ƒ) ǑǇǦƛ!ƒ

ƴƱǀǆž!ƒ ǏǁƵ ƖƥTǁ! ƧǈǇ ǎĂƿ ƫǀơƘǒĂ Ǖ ǘĂǕƒ ƒƧǒƤĂ ǑǇǦƛ!ƒ ǋǒǁǒ Ǖ ƚ!ǦƛƑ ƴƱǀǆž!ƒ ǏǁƵ Ɩƥǆǁ!

ƚ!ǦƛƑ ǋǒǁǒ Ǖ ǑǇǦƛ!ƒ ƴƱǀǆž!ƒ ǏǁƵ ƥƥƧƘǁ! ƧǈǇ ǏǁƵ ƫǀơƘǒĂ Ǖ ǑǇǦƛ!ƒ ƒƧǒƤĂ ƚ!ǦƛƑ ǋǒǁǒ Ǖ ǘĂǕƒ

. ǘĂǕƒ ƒƧǒƤĂ

: Ĭlj ǇǰǂƙƊǅǈǊ ƹǁŬƐǊ ƃƑǂǁƑƓ ơǮƦƊǅǁƐ Ĭ ƮƒƊǅǁƐ üƴƧǁƐ (øǉ



(Ta cā lā ĂǁƑƴǂ)　　　　(Ta bā ca da ơǮƳƑƓǂ)

ƯƓƸƥǁƐ ƯƓƸƊǅǁƐ			ƘǁƑƙǁƐ ƯƓƸƊǅǁƐ			Ĭ ǊƑƙǁƐ ƯƓƸƊǅǁƐ			üǊǍƐ ƯƓƸƊǅǁƐ			
ƥƥƧƙ!ƒ	ǉƥƬ!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥƬ!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥƬ!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥƬ!ƒ	ǉƥǆ!ƒ	ƕƊǅǂǁǁƐ
151	51	210	159	51	187	184	56	266	153	54	142	ơǮƳƑƓǂ
			155	52	400	186	56	279	141	53	193	ĂǁƑƴǂ

: ǇǑǁǂƬ ǇǆǄ ƻ!ŪƒĂ ƇƓƙ!ƓǓ ƥǒƨǆ!ƒ ǑƜƓǆ!ƒ ƴƷǁǁ! ǑƷƱǀǆ!ƒ ƔǒǂƧƙ!ƒ ǇĂǂƙǒ

ƴĂƱƊ ƨǀƠƙǒ5 (ƥƷƓǔƙ) ƴƷƼ!ƒ ǋǁǀƑǆǒĂ (θ f + θ f + θ θ f + θ f) ƴĂŪƒ

ǉƥƬǁ! ƧǔǊ ăĂƤƊ ƨǀƠƙǒĂ Ü ƴĂŪƒ ƒƐǒƤƊĂ ǂ!ƓƑ!ƒ ǋǒǁǁǒĂ ƴǔƒƧ!ƒ ǋǒǁǁǒ Ü ǑǇƓƑ!ƒ ƴƱǀǆ!ƒ ĬǁƷ ǉƥǆǁ! ƧǔǊ

ĬǁƷ ƥƥƧƙǁ! ƧǔǊ ĬǁƷƊ ƨǀƠƙǒĂ Ü ĂƓƪƙǓ ƴǔƒƧ!ƒĂ ǂ!ƓƑ!ƒ ƒƧǒƤƊĂ ƴĂŪƒ ǋǒǁǁǒ Ü ǑǇƓƑ!ƒ ƴƱǀǆ!ƒ ĬǁƷ

. ƴǔƒƧ!ƒ ƒƧǒƤƊĂ ƴĂŪƒ ǋǒǁǁǒĂ ǂ!ƓƑ!ƒ ǋǒǁǁǒ ÜǑǇƓƑ!ƒ ƴƱǀǆ!ƒ

ƻǁǰ ýǍƱƊ ƽǀơǩǒƼ (Ǐ!ǴȥǨ) ýƶƺ!ƒ ǋǏǍǆǒǍ (Ɵ Ɵ ƒ + Ɵ Ɵ ƒ + Ɵ ƒ) ǑǈǴǮ!ƒ

ǑǈǴǮ!ƒ ƴƱǀǆ!ƒ ǏǃƸ ǁƥƬǃ! ƻǁǰ ǎǍƿƊ ƽǀơǩǒǍ Ü ýǍǕƒ ƒƻǒƤƊǍ ǑǈǴǮ!ƒ ǋǒǃǒ ƚ!ǴǮ!ƒ ƴƱǀǆ!ƒ ǏǃƸ ǁƥǆǃ!

ƒƻǒƤƊǍ ƚ!ǴǮ!ƒ ǋǒǃǒ ǑǈǴǮ!ƒ ƴƱǀǆ!ƒ ǏǃƸ ƥƥƻǩǃ! ƻǁǰ ǏǃƸƊ ƽǀơǩǒǍ Ü ƚ!ǴǮ!ƒ ƒƻǒƤƊǍ ýǍǕƒ ǋǒǃǒ

.ýǍǕƒ

: ǍǁǄ ! ƨƽǏǋ Û ǄǏƺƥƟǴ ƣǏƦǄǁǁ ƱƥƑƮǄǁǁ üƴƻǁǁ ƥǴǆ

: Ǐǀǰ ǈǂǩǄǈǋ ǄǋǆǆǁǁǋǄ Ƹ ǁǓƑǴ ƣǏƦǄǁǁ ƱƥƑƮǄǁǁ üƴƻǁǁ (ƈ

(Yan ŝhq qu Ƽǃǆǐ) (Yan ka sir ru ƥƨǀǆǐ)

(Yan ma ḥĪ ǏƟǄǆǐ) (Yan qā du ƣƑƽǆǐ)

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
92	44	207	115	49	177	235	50	187	162	53	372	[illegible]
			102	47	161	233	47	328	158	51	368	[illegible]
			105	44	271	168	54	265	138	53	359	[illegible]
			101	45	298	166	52	167	138	53	355	[illegible]

[illegible] :

[illegible] ([illegible]) [illegible] (+ + +) [illegible]

[illegible]

[illegible]

[illegible] .

[illegible] ([illegible]) [illegible] (+ +) [illegible]

[illegible]

[illegible]

[illegible] .

ཞþdžǚ! ƧƸǉ ýĂƠƉ ʂlơƙõƼ (þĜlǉő) ýƺƼ!ƒ ƝǚǮdžőĂ (Ɵ ƒ + Ɵ Ɵ ƒ + ƒ Ɵ ƒ) Ƚ!ĜǮ!ƒ

ƝŏǚŐ ŎǉĜǮ!ƒ yƱldž!ƒ ǏǚƵ ཞþƬǚ! ƧƸǉ ăĂpƉ ʂlơƙŏĂ Ü Ƚ!ĜǮ!ƒ ƒƧŏƤƉĂ ŎǉĜǮ!ƒ ƝŏǚŐ ýĂǕƒ yƱldž!ƒ ǏǚƵ

. Ƚ!ĜǮ!ƒ ƒƧŏƤƉĂ ýĂǕƒ ƝŏǚŐ ŎǉĜǮ!ƒ yƱldž!ƒ ǏǚƵ þþƧƙǚ! ƧƸǉ ǏǚƵƉ ʂlơƙŏĂ Ü Ƚ!ĜǮ!ƒ ƒƧŏƤƉĂ ýĂǕƒ

ƧƸǉ ýĂƠƉ ʂlơƙõƼ (Ŏơdžǉő) ýƺƼ!ƒ ƝǚǮdžőĂ (Ɵ Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ) yǚƒƧ!ƒ

ýĂǕƒ yƱldž!ƒ ǏǚƵ ཞþƬǚ! ƧƸǉ ăĂpƉ ʂlơƙŏĂ Ü ŎǉĜǮ!ƒ ƒƧŏƤƉĂ Ƚ!ĜǮ!ƒ ƝŏǚŐ ýĂǕƒ yƱldž!ƒ ǏǚƵ ཞþdžǚ!

ƒƧŏƤƉĂ ýĂǕƒ ƝŏǚŐ ŎǉĜǮ!ƒ yƱldž!ƒ ǏǚƵ þþƧƙǚ! ƧƸǉ ǏǚƵƉ ʂlơƙŏĂ Ü Ƚ!ĜǮ!ƒ ƒƧŏƤƉĂ ŎǉĜǮ!ƒ ƝŏǚŐ

. Ƚ!ĜǮ!ƒ

: Ǐǉ ǇȽƙƉǅǋ ƅƑǁǋ ƔƦǅǊǁǦ ơǏƦǅǁ ƱþƑƮǅǁ üyƧǁ (ƒ

(Yaŝ taq qu ƼȽǂĭ)

(Yağ ta mi cu ƲǅȽǁĭ)

(Yad da cī ĬYŋĭ)

(Yax tā ru þƑǇĭ)

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
90	43	202	129	52	167	169	55	171	135	52	380	[illegible]
			95	45	167	179	48	335	135	51	345	[illegible]
			97	46	175	205	53	289	154	49	369	[illegible]
			94	45	308	142	56	118	122	51	393	[illegible]

[illegible] :

[illegible]

[illegible]

Ƨƕǉ ýǍƱ ƭǀơǩǒ5 (ƧǴƘPǒ) ýƺ5!ƒ ƝǁǮǆǒǍ (θ f + θ θ f + f θ f) ł!Ǥƛ!ƒ

ǑǉǤƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ǚƥT!! Ƨƕǉ ăǍpƉ ƭǀơǩǒǍ Ü ł!Ǥƛ!ƒ ƒƧǒPƉǍ ǑǉǤƛ!ƒ ƝǒǁǒýǍǛƒ yƱǀǆ!ƒ ǏǁƵ ǚƥǆ!!

ł!Ǥƛ!ƒ ƒƧǒPƉǍ ýǍǛƒ ƝǒǁǒǑǉǤƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ƥƥƧǩ!! Ƨƕǉ ǏǁƵƉ ƭǀơǩǒǍ Ü ł!Ǥƛ!ƒ ƒƧǒPƉǍ ýǍǛƒ Ɲǒǁǒ

.

Ƨƕǉ ýǍƱ ƭǀơǩǒ5 (ǑƵƥǒ) ýƺ5!ƒ ƝǁǮǆǒǍ (θ θ f + θ f + f θ f) yǖƒƧ!ƒ

ǑǉǤƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ǚƥT!! Ƨƕǉ ăǍpƉ ƭǀơǩǒǍ Ü ǑǉǤƛ!ƒ ƒƧǒPƉǍ ł!Ǥƛ!ƒ ƝǒǁǒýǍǛƒ yƱǀǆ!ƒ ǏǁƵ ǚƥǆ!!

ƒƧǒPƉǍ ýǍǛƒ ƝǒǁǒǑǉǤƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ƥƥƧǩ!! Ƨƕǉ ǏǁƵƉ ƭǀơǩǒǍ Ü ł!Ǥƛ!ƒ ƒƧǒPƉǍ ýǍǛƒ Ɲǒǁǒ

. ł!Ǥƛ!ƒ

: Ǌǉǉ ǇǁƑƙǅǊ !ǘǁɛ ƸǏƴƮƗǊ ƸǁǓƑǴ ƣǏƦǅǁɛ ƱƥƑƮǅǁɛ üƴƧǁɛ (ł



(Yaḥ mar ru ƥǅǏƟǏ)

ƘǁƑǁɛ ƯƱƨǅǁɛ			ǏǆƑǁɛ ƯƱƨǅǁɛ			üǊǓɛ ƯƱƨǅǁɛ			
ƥƥƧǩ!ƒ	ǚƥT!ƒ	ǚƥǆ!ƒ	ƥƥƧǩ!ƒ	ǚƥT!ƒ	ǚƥǆ!ƒ	ƥƥƧǩ!ƒ	ǚƥT!ƒ	ǚƥǆ!ƒ	ƕǅǂłǀǁɛ
90	44	161	153	50	334	130	51	281	ƥǅǏƟǏ

ϴ ƒ) ýǂT!ƒ LJdž DžǕ!ƒ ƻǒƶưkĂ lƨdžnj!Ǖ þǒƨdž!ƒ YƧƓưdž!ƒ ýƶƽ! ǑƶƱldž!ƒ Ɣǒǂƨk!ƒ LJĂǂkǒ

yƱldž!ƒ ĬƵ lþdž! Ƨhlj ýĂƱ ƽlơkǒ5 (ĈƧdžơǒ) ýƶƽ!ƒ NĂdžǒĂ (ϴ ƒ + ƒ ϴ ƒ + ƒ

ƒƧǒPĂ ǑLjĞ!ƒ Nǒǒ ýĂǛƒ yƱldž!ƒ ĬƵ lþT! Ƨhlj ăĂpD ƽlơkǒĂ Ü ł!Ğ!ƒ ƒƧǒPĂ ýĂǛƒ Nǒǒ ǑLjĞ!ƒ

. ł!Ğ!ƒ ƒƧǒPĂ ýĂǛƒ Nǒǒ ǑLjĞ!ƒ yƱldž!ƒ ĬƵ þþƧk! Ƨhlj ĬƵD ƽlơkǒĂ Ü ł!Ğ!ƒ

: Ĭlj LjǂkDžcNj DžǐyƐ ƹǐyƮǂNj ƀƒǂƑƓ ƣǐƦDžƐ ƱþƒƮDžƐ üyƻƐ (ƣ

(Ya ta zak kā Ă|Ʀǐ) (Ya ta cal la mu !ǂyƒǐ)

ƧDžƒƣƐ ƯƯƨDžƐ			ƯĈƃƐ ƯƯƨDžƐ			ƘƒkƐ ƯƯƨDžƐ			ĬdžƒkƐ ƯƯƨDžƐ			üNjǓƐ ƯƯƨDžƐ			
ƣƣþǂƐ	YƣƮƐ	YƣDžƐ	ƣƣþǂƐ	YƣƮƐ	YƣDžƐ	ƣƣþǂƐ	YƣƮƐ	YƣDžƐ	ƣƣþǂƐ	YƣƮƐ	YƣDžƐ	ƣƣþǂƐ	YƣƮƐ	YƣDžƐ	hDžǂ|Ɛ
99	46	210	110	52	114	149	53	262	127	53	198	108	50	203	!ǂyƒǐ
			111	48	387	158	50	425	138	52	150	131	50	203	Ĭǂƨkǒ

: ǇǊŏǁŧT ǇǊďž ǇǊŏž!ƒ ƻŏƶ ưƙĂ ƇƓƙ!Ɠŀ þŏƨďž!ƒ ƳƧƓưďž!ƒ ýƶƽǁ! ŎƶƱǀďž!ƒ ƔŏŧƧƙ!ƒ ǇǊĂŧƙŏ

(ǄǁƶƙŎ) ýƶƽ!ƒ ǋǊǁǅďžŏĂ (Θ ƒ + Θ ƒ + ƒ Θ ƒ + Θ ƒ + Θ ƒ) ýĂǕƒ

ǕyǋƒƧ!ƒ ƒƧŏƤǄĂ ŎǈƓǅ!ƒ ǋŏǁŏĂ ýĂǕƒ ǋŏǁŏĂ Σ ďƓƤ!ƒ ǋŏǁŏ ƚ !Ɠǅ!ƒ yƱǀďž!ƒ ǏǁƵ ǈþďǁ! ƧǋǈǇ ýĂƱǄ ƨǀơƙŏƽ

ƒƧŏƤǄĂ ýĂǕƒ ǋŏǁŏĂ yǋƒƧ!ƒ ǋŏǁŏ ĂƓƪƙŀ ƚ !ƓǅƒĂ ŎǈƓǅ!ƒ yƱǀďž!ƒ ǏǁƵ ǈþTǁ! ƧǋǈǇ ăĂpǄ ƨǀơƙŏĂ

ýĂǕƒ ǋŏǁŏĂ yǋƒƧ!ƒ ǋŏǁŏĂ ŎǈƓǅ!ƒ ǋŏǁŏ ƚ !Ɠǅ!ƒ yƱǀďž!ƒ ǏǁƵ þþƧƙǁ! ƧǋǈǇ ǏǁƵǄ ƨǀơƙŏĂ Ǖ Σ ďƓƤ!ƒ

. Σ ďƓƤ!ƒ ƒƧŏƤǄĂ

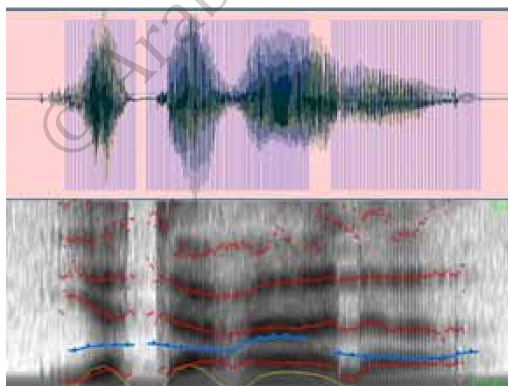
ƨǀơƙŏƽ (Ǐŧƨƙŏ) ýƶƽ!ƒ ǋǊǁǅďžŏĂ (Θ Θ ƒ + ƒ Θ ƒ + Θ ƒ + Θ ƒ) ŎǈƓǅ!ƒ

ƧǋǈǇ ăĂpǄ ƨǀơƙŏĂ Ǖ ŎǈƓǅ!ƒ ƒƧŏƤǄĂ ýĂǕƒ ǋŏǁŏĂ yǋƒƧ!ƒ ǋŏǁŏ ƚ !Ɠǅ!ƒ yƱǀďž!ƒ ǏǁƵ ǈþďǁ! ƧǋǈǇ ýĂƱǄ

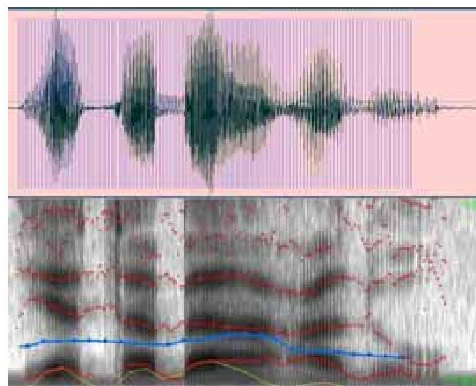
þþƧƙǁ! ƧǋǈǇ ǏǁƵǄ ƨǀơƙŏĂ Ǖ yǋƒƧ!ƒ ƒƧŏƤǄĂ ĂƓƪƙŀ ƚ !ƓǅƒĂ ýĂǕƒ ǋŏǁŏ ŎǈƓǅ!ƒ yƱǀďž!ƒ ǏǁƵ ǈþTǁ!

. yǋƒƧ!ƒ ƒƧŏƤǄĂ ýĂǕƒ ǋŏǁŏĂ ŎǈƓǅ!ƒ ǋŏǁŏ ƚ !Ɠǅ!ƒ yƱǀďž!ƒ ǏǁƵ

: Ǐǉ ǇǉŧƙǄǄǋ Ƹ ǁǓƐǋ ƀƑǁƑƓ ơǏƦǄǁƐ ƱþƑƮǄǁƐ üyƻǁƐ (øøǉ



(Ya ta cā lā Ăǁƒyŧĭ)



(Ya ta bā ca du ơYƑƓŧĭ)

[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
79	42	191	113	49	224	147	55	228	132	53	170	135	52	231	[illegible]
			106	47	403	142	53	335	129	54	211	130	53	262	[illegible]

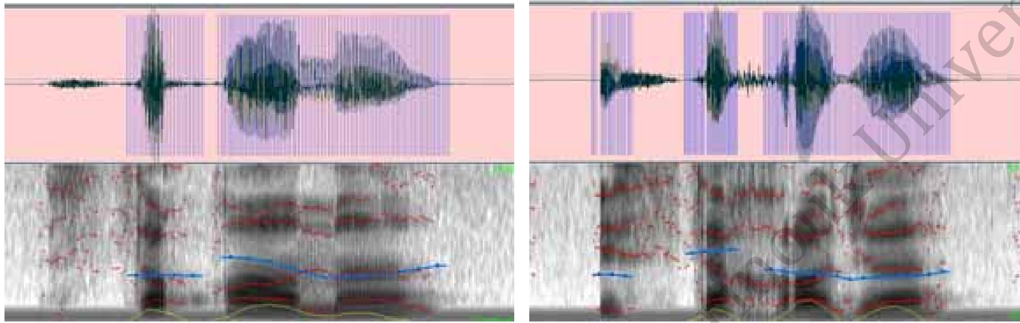
[illegible]

[illegible]

[illegible]

: Ăǁđ ! ƨ ƭĭǸ Û ƹ ƥϴ ƈ ƕƙǘƙǴ ơĭƦǅǁƐ üƴƻǁƐ ƥǴ : ƑƙǁƑƙ

: ƃƑƚǁƐǸ ǄĭƨǁƐǸ ƹ ǁŬƑǴ ơĭƦǅǁƐ Ĭ ƮƑǅǁƐ üƴƻǁƐ ƥǴ (ƈ



('is ta qā ma !ƑƭƗƨƐ)　　　('is tax ra ǧa ƗƥƜƗƨƐ)

ƲǴƐƥǁƐ ƲƲƭǅǁƐ			ƘǁƑƙǁƐ ƲƲƭǅǁƐ			ĬǳƑƙǁƐ ƲƲƭǅǁƐ			üǸǕƐ ƲƲƭǅǁƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆǆƷ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆǆƷ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆǆƷ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	ƖƥǆǆƷ!ƒ	ƕǅƗ l ǁƐ
158	51	225	164	54	208	234	50	226	162	45	298	ƗƥƜƗƨƐ
162	51	220	208	52	279	171	53	155	153	46	266	!ƑƭƗƨƐ

: ǇǑǁƗT ǇǆǆƷ ǦǴƙ!ƒĂ ǇǑƪ!ƒĂ ƻ!ŬǴƕ ƥǑƨǆǆƷ!ƒ Ǒ ư Ǵǆǆƶ!ƒ ýƶƨǁ! ǑƶƱlǆǆƷ!ƒ ƔǑƗƧƙ!ƒ ǇĂƗƙǑ

ƭlơƙǑ5 (ƜƧƤƙƪƒ) ýƶƨ!ƒ ǋǁǅǆǑĂ (ϴ ƒ + ϴ ƒ + ƒ ϴ ƒ + ƒ ϴ ƒ) ýĂŪƒ

Ƨƕǉ ăĂƥƉ ƭlơƙǑĂ Ü Ɨ!ǦƛƒƒƧǑƤƉĂ ƴƕƒƧ!ƒ ǋǑǁǑĂ ǑǈǦƛ!ƒ ǋǑǁǑ ýĂŪƒ ƴƱlǆǆƷ!ƒ ĬǁƵ ƖƥǆǆƷǁ! Ƨƕǉ ýĂƱƉ

ĬǁƵ ƥƥƧƙǁ! Ƨƕǉ ĬǁƵƉ ƭlơƙǑĂ Ü ýĂŪƒ ƒƧǑƤƉĂ ƴƕƒƧ!ƒ ǋǑǁǑĂ ǑǈǦƛ!ƒ ǋǑǁǑ Ɨ!ǦƛƒƴƱlǆǆƷ!ƒ ĬǁƵ ƖƥTǁ!

. ƴƕƒƧ!ƒ ƒƧǑƤƉĂ ýĂŪƒ ǋǑǁǑĂ Ɨ!ǦƛƒǋǑǁǑ ǑǈǦƛ!ƒ ƴƱlǆǆƷ!ƒ

ýĂ℧ ƨlơƙŏ5 (ǊĈlƙʅƒ) ýƶ5!ƒ ǋǊĂdžŏĂ (ɵ ƒ + ɵ ɵ ƒ + ɵ ƒ + ƒ ɵ ƒ) ŎǉĈλ!ƒ

ƖɓTǉ! ƧǉǊ ăĂpǊ ƨlơƙŏĂ Ü ŎǉĈλ!ƒ ƒƧŏƤǊĂ yǉƒƧ!ƒ ǋŏǉŏĂ ýĂǕƒ ǋŏǉŏ ƚ!Ĉλ!ƒ y℧ldž!ƒ ǏǉƵ Ɩɓdž! ƧǉǊ

y℧ldž!ƒ ǏǉƵ ɓɓƧƙǉ! ƧǉǊ ǏǉƵǊ ƨlơƙŏĂ Ü ýĂǕƒ ƒƧŏƤǊĂ yǉƒƧ!ƒ ǋŏǉŏĂ ƚ!Ĉλ!ƒ ǋŏǉŏ ŎǉĈλ!ƒ y℧ldž!ƒ ǏǉƵ

. ýĂǕƒ ƒƧŏƤǊĂ yǉƒƧ!ƒ ǋŏǉŏĂ ŎǉĈλ!ƒ ǋŏǉŏ ƚ!Ĉλ!ƒ

: ǋǉǊ ǈǉƑƙǊǅǋ ǋƐǋǉƐǋ ƹǉǕƑĈ ƣĭƦǊǅǉƐ Ǐ ƮƑǊǅǉƐ üyƵǉƐ ɓĈdž (ƒ

('iġ daw da na ǅƣǋƣʓƐ)

ǙĈƐɓǉƐ ǙǙƨǅǉƐ			ƘǉƑƙǉƐ ǙǙƨǅǉƐ			ǏdžƑƙǉƐ ǙǙƨǅǉƐ			üǋǕƐ ǙǙƨǅǉƐ			
ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓdž!ƒ	ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓdž!ƒ	ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓdž!ƒ	ɓɓƧƙ!ƒ	ƖɓT!ƒ	Ɩɓdž!ƒ	ǊǅǉƚlǉƐ
153	45	287	163	53	227	158	54	359	161	50	192	ǅƣǋƣʓƐ

ƒ + ƒ ɵ ƒ) ýƚT!ƒ ǇǊdž ĂƒĂ!ƒĂ Ü ƖƨdžǌǉĈǉ ɓŏƨdž!ƒ Ŏư Ĉdž!ƒ ýƶ5ǉ! Ŏƶ℧ldž!ƒ Ɣŏƚ Ƨƙ!ƒ ǇĂƚƙŏ

y℧ldž!ƒ ǏǉƵ Ɩɓdž! ƧǉǊ ýĂ℧ǊƨlơƙŏƸ (ǇɓĂɓƹƒ) ýƶ5!ƒ ǋǊĂdžŏĂ (ɵ ƒ + ɵ ƒ + ƒ ɵ

ǋŏǉŏ ŎǉĈλ!ƒ y℧ldž!ƒ ǏǉƵ ƖɓTǉ! ƧǉǊ ăĂpǊ ƨlơƙŏĂ Ü ýĂǕƒ ƒƧŏƤǊĂ ƚ!Ĉλ!ƒ ǋŏǉŏĂ yǉƒƧ!ƒ ǋŏǉŏ ŎǉĈλ!ƒ

[illegible]

('iḥ mār ra [illegible])

[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
151	51	209	167	54	520	153	48	260	[illegible]

[illegible]

[illegible]

. [illegible]

: [illegible]

('iğ law wa ɗa [illegible])

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
155	52	244	144	56	150	182	57	337	137	48	207	[illegible]

[illegible]

[illegible]

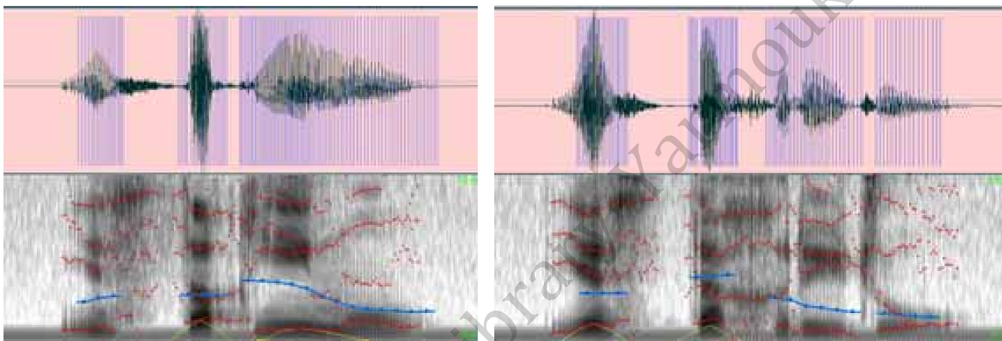
[illegible]

NǒǐǒĂ yǹƒƧ!ƒ Nǒǐǒ ǑǉǤ!ƒ yƱǀǆ!ƒ ǏǐƵ þþƧǩ! Ƨǌǉ ǏǐƵƉ ƽǀơǩǒĂ Ü ýĂǕƒ ƒƧǒƤƉĂ yǹƒƧ!ƒ NǒǐǒĂ ɫ!Ǥ!ƒ

. ýĂǕƒ ƒƧǒƤƉĂ ɫ!Ǥ!ƒ

: Ăǁǁ !ƨƾĭǋ ƹþƟc ǌǩǘǨǴ ơĭƦǅǁǁ ƱþƑƮǅǁǁ üyƻǁǁ þǴǆ

. Ĭǉ ǈǂǩǅǈǌ ƅƑǂǁǁǋ ǅǆĭƨǁǁǋ ƔƦǅǋǁǁƑǴ ơĭƦǅǁǁ ƱþƑƮǅǁǁ üyƻǁǁ þǴǆ (c



(Yas ta q**Ī** mu !ĭšɫƨĭ)   (Yas tax ri **ǧ**u ɫþǷɫƨĭ)

ƲǴƐþǁǁ ƲƲƽǅǁǁ			ƘǁǁƑǩǁǁ ƲƲƽǅǁǁ			ĬǆƑǩǁǁ ƲƲƽǅǁǁ			üǋǕǁǁ ƲƲƽǅǁǁ			
þþƧǩ!ƒ	ǉþƬ!ƒ	ǉþǆ!ƒ	þþƧǩ!ƒ	ǉþƬ!ƒ	ǉþǆ!ƒ	þþƧǩ!ƒ	ǉþƬ!ƒ	ǉþǆ!ƒ	þþƧǩ!ƒ	ǉþƬ!ƒ	ǉþǆ!ƒ	ǌǅǂǀǁǁ
96	42	199	122	47	214	209	51	226	158	50	318	ɫþǷɫƨĭ
113	48	244	178	51	265	152	54	134	146	45	285	!ĭšɫƨĭ

ƒ) ýĂǕƒ : ǇǒǐǂƬ Ǉǆ ĂƒĂ!ƒ ƻǒƶƣǩĂ ƻ!ǕǤ þǒƨǆ!ƒ Ǒƣǆ!ƒ ýƶǃǐ! ǑƶƱǀǆ!ƒ Ɣǒǂ Ƨǩ!ƒ ǇĂǂǩǒ

ǉþǆǐ! Ƨǌǉ ýĂƱƉ ƽǀơǩǒƼ (ШƧƤǩƪǒ) ýƶƼ!ƒ NǐǉǆǒĂ (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ + ƒ Ɵ

yƱǀǆ!ƒ ǏǐƵ ǉþƬǐ! Ƨǌǉ ăĂƿƉ ƽǀơǩǒĂ Ü yǹƒƧ!ƒ ƒƧǒƤƉĂ ɫ!Ǥ!ƒ NǒǐǒĂ ǑǉǤ!ƒ Nǒǐǒ ýĂǕƒ yƱǀǆ!ƒ ǏǐƵ

ǸǒǏǒ ǑǉǤǅ!ƒ ƴƱǀǆ!ƒ ǏǈƵ ƥƥƧǩǈ! ƧǶǰ ǏǈƵǅ ƨǀơǩǒǍ Ü ƴǹƒƧ!ƒ ƒƧǒƤǅǍ Ɨ!Ǥǅ!ƒ ǸǒǈǒǍ ýǍǗƒ ǸǒǈǒǑǉǤǅ!ƒ

. ƴǹƒƧ!ƒ ƒƧǒƤǅǍ Ɨ!Ǥǅ!ƒ ǸǒǈǒǍ ýǍǗƒ

ýǍƱǅ ƨǀơǩǒƼ (ǅǒǀǨƪǒ) ýƶƽ!ƒ ǸǈǅǆǒǍ (θ ƒ + θθ ƒ + θ ƒ + ƒ θ ƒ) ǑǉǤǅ!ƒ

ǀƥƬǈ! ƧǶǰ ǎǍƿǅ ƨǀơǩǒǍ Ü ǑǉǤǅ!ƒ ƒƧǒƤǅǍ ƴǹƒƧ!ƒ ǸǒǈǒǍ Ɨ!Ǥǅ!ƒ ǸǒǈǒǏ ýǍǗƒ ƴƱǀǆ!ƒ ǏǈƵ ǀƥǆǈ! ƧǶǰ

ƴƱǀǆ!ƒ ǏǈƵ ƥƥƧǩǈ! ƧǶǰ ǏǈƵǅ ƨǀơǩǒǍ Ü ýǍǗƒ ƒƧǒƤǅǍ ƴǹƒƧ!ƒ ǸǒǈǒǍ Ɨ!Ǥǅ!ƒ ǸǒǈǒǑǉǤǅ!ƒ ƴƱǀǆ!ƒ ǏǈƵ

. ƴǹƒƧ!ƒ ƒƧǒƤǅǍ ýǍǗƒ ǸǒǈǒǍ ǑǉǤǅ!ƒ ǸǒǈǒƗ!Ǥǅ!ƒ

: ǸǰǏǰ ǇǰǁƑǨǅǍǸǰ ǸǰƐǸǰǁƐǸǰ ƔƦǅǍǸǁƑǤ ơǏƦǅǍǁƐ ƱƥƑƮǅǍǁƐ üƴƻǁƐ ƥǤǅ (ƒ

(Yaġ daw di nu ǅǏǰǸǰƮƑǏ)

ÜĜĘþǁǁ ÜÜƨĎǁǁ			ƘǁƑǁǁ ÜÜƨĎǁǁ			Ĭ݊Ƒǁǁ ÜÜƨĎǁǁ			üǋǓǁ ÜÜƨĎǁǁ			
þþƧǩ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧǩ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧǩ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	þþƧǩ!ƒ	ƖþT!ƒ	Ɩþǆ!ƒ	ƕĎǂǀǁ
101	43	165	130	45	222	144	53	263	118	50	320	ǅǒǋƍƩǐ

ƒ ϴ ƒ) ýǂT!ƒ Ǉǆ ĂƒĂ!ƒ ƻǒƺ ư ǩĂ ƻ!Ǖǀ þǒƨǆ!ƒ Ŏ ư Ĝǆ!ƒ ýƺƽ! ŎƺƱǀǆ!ƒ Ɣǒǂ Ƨǩ!ƒ ǇĂǂ ǩǒ

Ĭ݊Ƶ Ɩþǆǀ! Ƨǁǉ ýĂƱĎ ƨ ǀ ơǩǒƽ (ǇþĂþƺǒ) ýƺƽ!ƒ ǋǀǅǆǒĂ (ϴ ƒ + ϴ ƒ + ƒ ϴ ƒ +

ƴƱǀǆ!ƒ Ĭ݊Ƶ ƖþTǀ! Ƨǁǉ ăĂǷ ƨ ǀ ơǩǒĂ Ü ƴǀƒƧ!ƒ ƒƧǒƤĎĂ ǂ !ǦǍ!ƒ ǋǒǀǒĂ ŎǉǦǍ!ƒ ǋǒǀǒ ýĂǕƒ ƴƱǀǆ!ƒ

ǋǒǀǒ ŎǉǦǍ!ƒ ƴƱǀǆ!ƒ Ĭ݊Ƶ þþƧǩǀ! Ƨǁǉ Ĭ݊ƵĎ ƨ ǀ ơǩǒĂ Ü ƴǀƒƧ!ƒ ƒƧǒƤĎĂ ǂ !ǦǍ!ƒ ǋǒǀǒĂ ýĂǕƒ ǋǒǀǒ ŎǉǦǍ!ƒ

. ƴǀƒƧ!ƒ ƒƧǒƤĎĂ ýĂǕƒ ǋǒǀǒĂ ǂ !ǦǍ!ƒ

: ǋǉǉ ǇǁƑǩĎǋ !ǘǁǁ ƹ ĭƴƬǂǋ ƹ ǁǓǂǋ ƔƦĎǋǁǁƑĜ ơĭƦĎǁǁ Ʊþƒ ƬĎǁǁ üƴƻǁǁ þĜǆ (ǂ

(Yaḩ mār ru þƑĎϴĭ)

ƘǁƒƙǁƐ ƯƯƨƊǁƐ			ǏǆƒƙǁƐ ƯƯƨƊǁƐ			üǋǕƐ ƯƯƨƊǁƐ		
ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƥƥƧƙ!ƒ	ǉƥT!ƒ	ǉƥǆ!ƒ	ƕƊǅǂǀǁƐ
106	45	190	145	51	528	106	50	383	ƥƑǅƟĭ

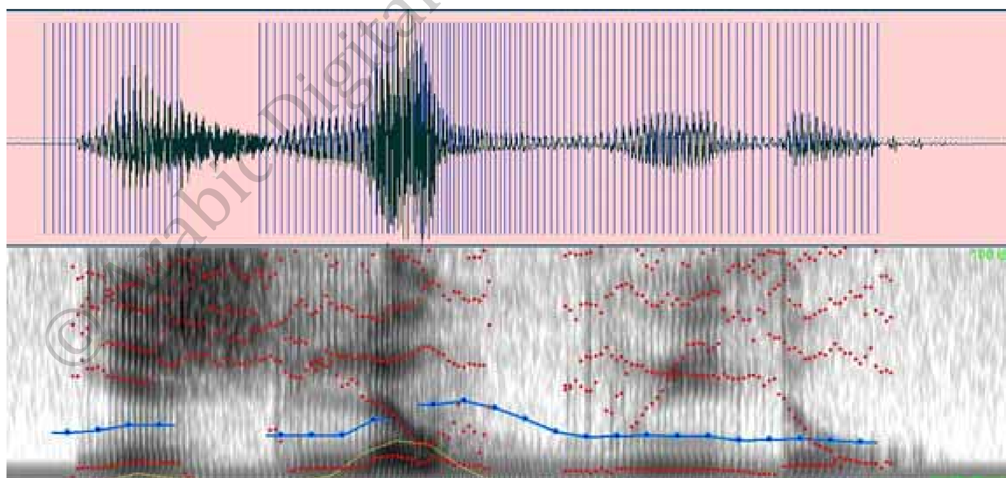
+ f Ɵ f) ýǂT!ƒ ǇǆƷ ĂƒĂ!ƒ ƻ ŏƶ ư ƙĂ ƻ !ǕƓ ƥŏƨǆ!ƒ Ŏ ư Ɠǆ!ƒ ýƶƺǁ! ŎƶƱǀǆ!ƒ Ɣŏǂ Ƨƙ!ƒ ǇĂǂƙŏ

ŎǉƓƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ǉƥǆǁ! Ƨǈǌ ýĂƱƊ ƽǀơƙŏƽ (ƸƓǆơŏ) ýƶƺ!ƒ ǊǁƛǆŏĂ (Ɵ f + f ƟƟ f

ƒƧŏƤƊĂ ýĂǕƒ ǊŏǁŏŎǉƓƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ǉƥTǁ! Ƨǈǌ ăĂƥƊ ƽǀơƙŏĂ Ü ƚ !Ɠƛ!ƒ ƒƧŏƤƊĂ ýĂǕƒ Ǌŏǁŏ

. ýĂǕƒ ǊŏǁŏŎǉƓƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ƥƥƧƙǁ! Ƨǈǌ ǏǁƵƊ ƽǀơƙŏĂ Ü ƚ !Ɠƛ!ƒ

: ǋǀǰ ǇǁƒƙƊǅǋ ǋƐǋǁƐ ƹ ĭy Ƭǂǋ ƔƦƊǅǊǁƒƓ ƣĭƦƊǅǁƐ Ʊƥƒ ƬƊǅǁƐ üyƻǁƐ ƥƓǆ (ƣ



(Yağ law wi ɖu ƤǋǂǀǁĭԐ)

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
106	44	133	113	47	190	142	53	337	133	49	216	[illegible]

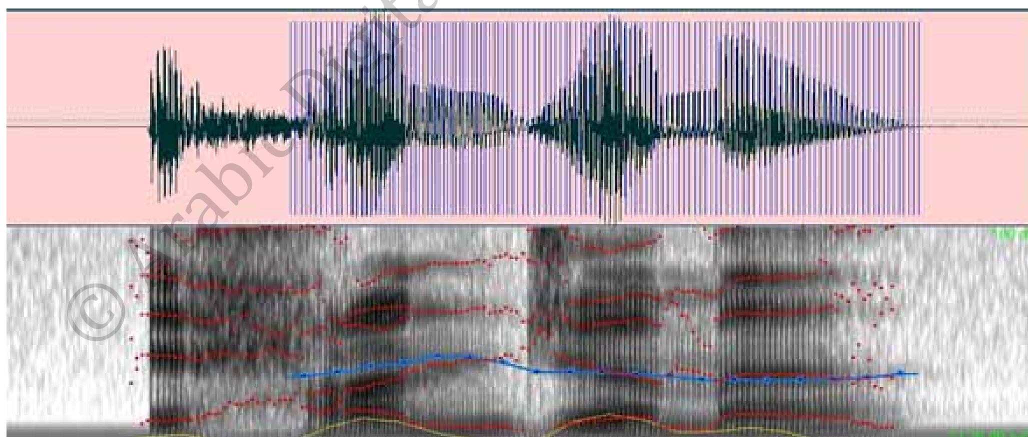
[illegible]

(Ta daḥ ra ğa [illegible])

[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
140	50	209	150	50	211	215	54	219	153	51	152	[illegible]

: [illegible] ([illegible]) [illegible] (ɵ ʄ + ɵ ʄ + ʄ ɵ ʄ + ɵ ʄ) [illegible]

[illegible] .



('iḥ ran ǧa ma [illegible])

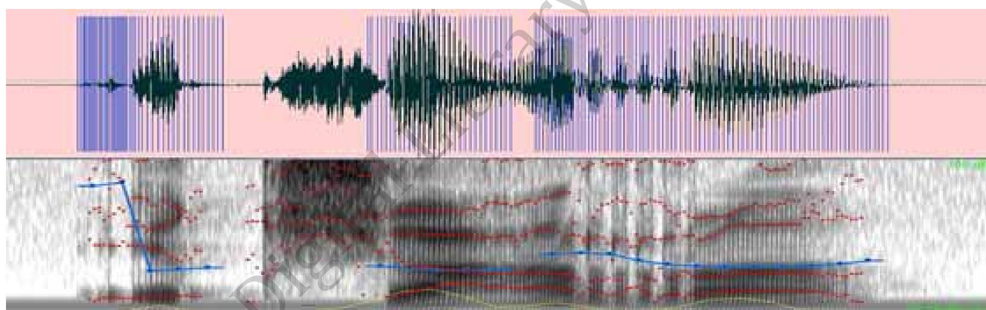
ƱƓƐƥǁǁƐ ƱƱƨƊǁǁƐ			ƘǁƑǁƐ ƱƱƨƊǁǁƐ			Ĭǆǁǁ ƱƱƨƊǁǁƐ			üǊŬƐ ƱƱƨƊǁǁƐ			
ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƕƊƗǀǁƐ
156	50	252	159	53	187	198	55	323	147	49	292	!ƜƥƟƐ

ƫǀƠƘƼ (ƉƞǇƧƠƒ) ýƺƼ!ƒ ǋǁƛǆǒǍ (θ ƒ + θ ƒ + ƒ θ ƒ + ƒ θ ƒ) ǑǇƓ!ƒ

ƧǁǇ ăĂƿ ƫǀƠƘǒǍ Ü Ɨ!ƓƛƒƧǒƤǍ ƴƒƧ!ƒ ǋǒǁǒǍ ýĂǕƒ ǋǒǁǒ Ɨ!ƓƛƒƴƱǀǆ!ƒ Ĭ!Ƶ ƪƥǆ! Ƨǁǉ ýĂƱ

Ĭ!Ƶ ƥƥƧƘ! Ƨǁǉ Ĭ!Ƶ ƫǀƠƘǒǍ Ü ýĂǕƒ ƒƧǒƤǍ ƴƒƧ!ƒ ǋǒǁǒǍ Ɨ!ƓƛƒǋǒǁǒǑǇƓ!ƒ ƴƱǀǆ!ƒ Ĭ!Ƶ ƪƥT!

. ýĂǕƒ ƒƧǒƤǍ ƴƒƧ!ƒ ǋǒǁǒǍ Ɨ!Ɠƛ!ƒ ǋǒǁǒ ǑǇƓ!ƒ ƴƱǀǆ!ƒ



('iq ŝa car ra ƥƔƪƸƐ)

ƱƓƐƥǁǁƐ ƱƱƨƊǁǁƐ			ƘǁƑǁƐ ƱƱƨƊǁǁƐ			Ĭǆǁǁ ƱƱƨƊǁǁƐ			üǊŬƐ ƱƱƨƊǁǁƐ			
ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƣƣƥƗǁƐ	ƔƣƪǁƐ	ƔƣƊǁƐ	ƕƊƗǀǁƐ
157	52	241	186	52	250	146	53	212	168	51	287	ƥƔƪƸƐ

[illegible] (θ f + f θ f + θ f + f θ f) [illegible]

[illegible]

[illegible]

[illegible] .

(Ta ǧal ba ba [illegible])

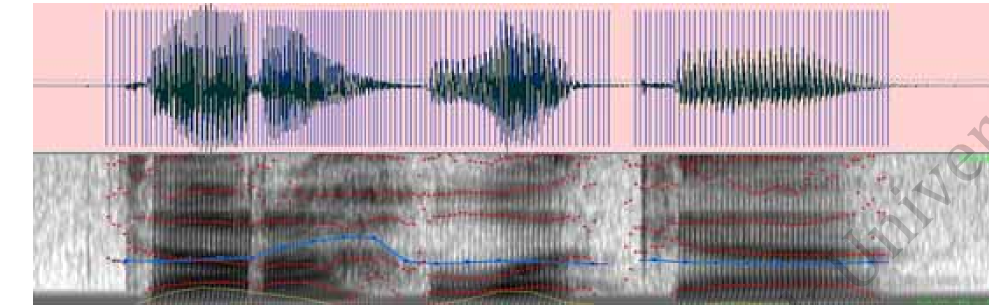
[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
149	52	246	153	57	146	180	55	300	136	52	132	[illegible]

[illegible] (θ f + θ f + f θ f + θ f) [illegible]

[illegible]

[illegible]

[illegible] .



(Ta rah wa ka pǸǰǰƥȴ)

ƱƓƹƥǁǁƐ ƱƱƨƊǁǁƐ			ƘǁƑƙǁǁƐ ƱƱƨƊǁǁƐ			Ǐǁǁ ƙǁǁƐ ƱƱƨƊǁǁƐ			üǸǓƐ ƱƱƨƊǁǁƐ			
ƣƣƥȴǁǁƐ	ƔƣƪǁǁƐ	ƔƣƊǁǁƐ	ƣƣƥȴǁǁƐ	ƔƣƪǁǁƐ	ƔƣƊǁǁƐ	ƣƣƥȴǁǁƐ	ƔƣƪǁǁƐ	ƔƣƊǁǁƐ	ƣƣƥȴǁǁƐ	ƔƣƪǁǁƐ	ƔƣƊǁǁƐ	ƕƊǂǀǁǁƐ
145	46	277	136	47	234	209	52	293	149	53	177	pǸǰǰƥȴ

ýǍƱƊ ƫǀƋƙǒ5 (ǁǍǸƧǩ) ýƶ5!ƒ ǋǁǍǆǒǍ (ϴ ƒ + ϴ ƒ + ƒ ϴ ƒ + ϴ ƒ) ƩǆǴƤ!ƒ

ǀƥƬǁ! ƧǁǊ ǎǍpƊ ƫǀƋƙǒǍ Ü ýǍǕƒ ƒƧǒƤƊǍ ƚ!ǴǍ!ƒ ǋǒǁǒǍ ƴǁƒƧ!ƒ ǋǒǁǒ ǑǈǴǍ!ƒ ƴƱǀǆ!ƒ Ǐǁ Ʒ ǀƥǆǁ! ƧǁǊ

ƴƱǀǆ!ƒ Ǐǁ Ʒ ƥƥƧǩǁ! ƧǁǊ ǏǁƷƊ ƫǀƋƙǒǍ Ü ƴǁƒƧ!ƒ ƒƧǒƤƊǍ ƚ!ǴǍ!ƒ ǋǒǁǒǍ ǑǈǴǍ!ƒ ǋǒǁǒ ýǍǕƒ ƴƱǀǆ!ƒ Ǐǁ Ʒ

. ƚ!ǴǍ!ƒ ƒƧǒƤƊǍ ƴǁƒƧ!ƒ ǋǒǁǒǍ ýǍǕƒ ǋǒǁǒ ǑǈǴǍ!ƒ

(ta ŝay ta na ǅǻǓǏǮǂ)

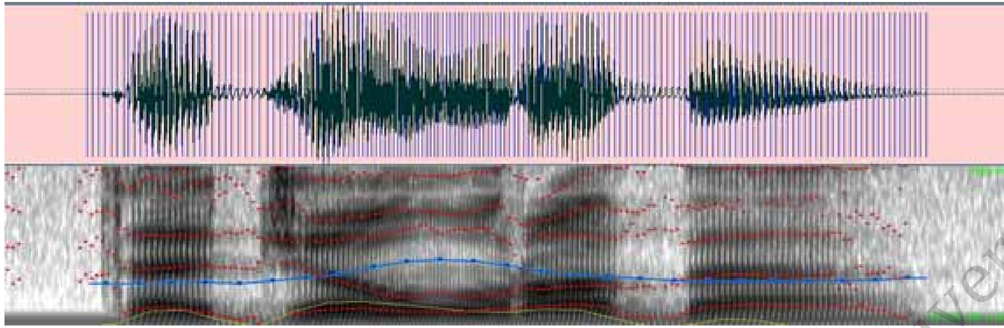
ǓǴƥǁǁ ǓǕƨǅǁǁ			ƘǁǭǁǁǁǓǕƨǅǁǁ			ǏǻǭǁǁǁǓǕƨǅǁǁ			üǊǕǁ ǓǕƨǅǁǁ		
ǫǫƥǂǁǁ	Ɣǫʅǁǁ	Ɣǫǅǁǁ	ǫǫƥǂǁǁ	Ɣǫʅǁǁ	Ɣǫǅǁǁ	ǫǫƥǂǁǁ	Ɣǫʅǁǁ	Ɣǫǅǁǁ	ǫǫƥǂǁǁ	Ɣǫʅǁǁ	Ɣǫǅǁǁ	ƕǅǂǀǁǁ
150	50	247	145	52	167	211	55	380	165	50	187	ǅǻǓǏǮǂ

ýǍƱǅ ƨǀơǩǒ (ǇƱǒƬǩ) ýƶƨ!ƒ ǊǅǻǆǒǍ (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ + Ɵ ƒ) ƩƥǴʅ!ƒ

ǀƥƬǁ! ƨǁǈ ăǍƿǅ ƨǀơǩǒǍ Ü ǂ!ǴǷ!ƒ ƒƨǒƤǅǍ ýǍǕƒ ǊǒǁǒǍ ýǁƒƨ!ƒ ǊǒǁǒǑǈǴǷ!ƒ ýƱǀǆ!ƒ ǏǁƵ ǀƥǆǁ! ƨǁǈ

ǏǁƵ ƥƥƨǩǁ! ƨǁǈ ǏǁƵǅ ƨǀơǩǒǍ Ü ǍǴʅǩǁ ýǁƒƨ!ƒǍ ýǍǕƒ ƒƨǒƤǅǍ ǂ!ǴǷ!ƒ ǊǒǁǒǑǈǴǷ!ƒ ýƱǀǆ!ƒ ǏǁƵ

. ǂ!ǴǷ!ƒ ƒƨǒƤǅǍ ýǁƒƨ!ƒ ǊǒǁǒǍ ýǍǕƒ ǊǒǁǒǑǈǴǷ!ƒ ýƱǀǆ!ƒ



(Ta ğaw ra ba ƒþŃǰШŧ)

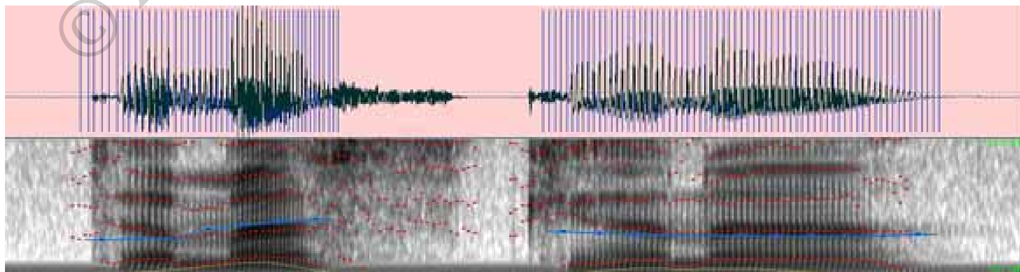
ƯƓƐþǁǁƐ ƯƯƨDŽǁƐ			ƘǁƑƙǁƐ ƯƯƨDŽǁƐ			ǏǆƑƙǁƐ ƯƯƨDŽǁƐ			üǋǓƐ ƯƯƨDŽǁƐ			
ơơþŧǁƐ	ƔơƮǁƐ	ƔơDŽǁƐ	ơơþŧǁƐ	ƔơƮǁƐ	ƔơDŽǁƐ	ơơþŧǁƐ	ƔơƮǁƐ	ƔơDŽǁƐ	ơơþŧǁƐ	ƔơƮǁƐ	ƔơDŽǁƐ	ƕDŽǂǁƐ
150	47	286	163	53	189	180	56	334	138	54	166	ƒþŃǰШŧ

ýĂƱǊ ƪlơƙő5 (ƔƧĂƞƙ) ýƶ!ƒ ǊǏƛdžőĂ (ɵ ƒ + ɵ ƒ + ƒ ɵ ƒ + ɵ ƒ) ýƙƓƮ!ƒ

ƖþƬǁ! Ƨƕǉ ăĂpǊ ƪlơƙőĂ ü ýĂŪƒ ƒƧőƤǊĂ ł!ƓƛǃƒǊőǁőĂ ýƙƒƧ!ƒ Ǌőǁő ŎǉƓƛ!ƒ ýƱldž!ƒ ǏǁƵ ƖþdžǁǃƧƕǉ

ýƱldž!ƒ ǏǁƵ þþƧƙǁ! Ƨƕǉ ǏǁƵǊ ƪlơƙőĂ ü ýƙƒƧ!ƒ ƒƧőƤǊĂ ŎǉƓƛ!ƒ ǊőǁőĂ ýĂŪƒ Ǌőǁő ł!ƓƛǃƒýƱldž!ƒ ǏǁƵ

. ýĂŪƒ ƒƧőƤǊĂ ýƙƒƧ!ƒ ǊőǁőĂ ł!ƓƛǃƒǊőǁő ŎǉƓƛ!ƒ

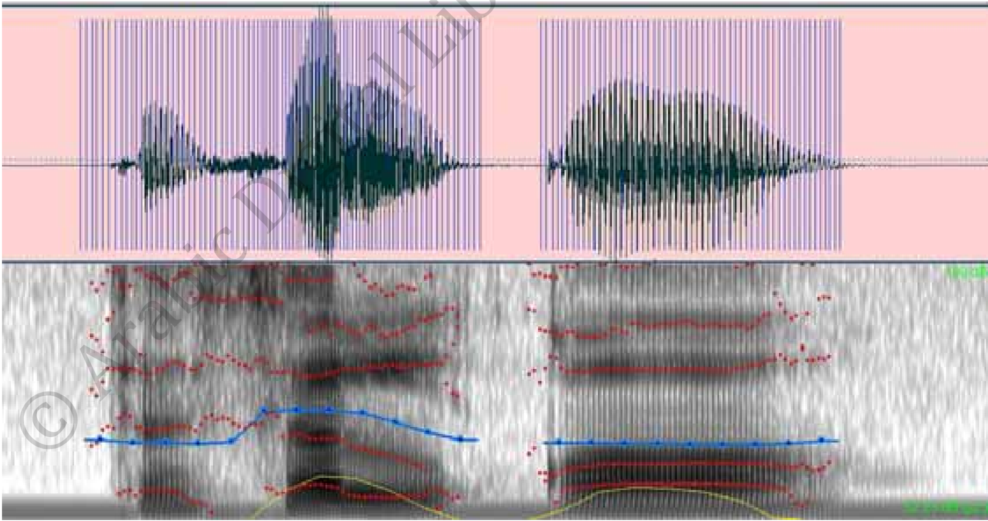


(Ta mas ka na DžǁŃƨDžŧ)

ǓƠƐƥǁǁƐ ǓƯƨƊǁǁƐ			ƘǁƒƙǁƐ ǓƯƨƊǁǁƐ			ǏǁƒƙǁƐ ǓƯƨƊǁǁƐ			ǚǋǓƐ ǓƯƨƊǁǁƐ			
ƣƣƥǂǁƐ	ƔƣƪǁƐ	ƔƣƊǁǁƐ	ƣƣƥǂǁƐ	ƔƣƪǁƐ	ƔƣƊǁǁƐ	ƣƣƥǂǁƐ	ƔƣƪǁƐ	ƔƣƊǁǁƐ	ƣƣƥǂǁƐ	ƔƣƪǁƐ	ƔƣƊǁǁƐ	ƕƊǂǁǁƐ
150	50	282	157	53	210	202	49	390	157	51	135	ǄǁƸǄǂ

ýĂƱƊ ƨǀơƙƼ (ǇǂƪǆƘ) ýƻǃƒ ǊǆǆǅĂ (ɵ ſ + ɵ ſ + ſ ɵ ſ + ɵ ſ) ǇǆƓǃƒ ǀƥƬǃ! ƧƕǊ ăĂƿƊ ƨǀơƙǅĂ Ü ýĂŪƒ ƒƧǒƤƊĂ ǂ!ƓǃƒǊǅǆǅĂ ƴƒƧ!ƒ ǊǆǆǅŎǊƓǃƒ ƴƱǀǆ!ƒ ǏǆƵ ǀƥǆ!ƧƕǊ ƴƱǀǆ!ƒ ǏǆƵ ƥƥƧƙ!ƧƕǊ ǏǆƵƊ ƨǀơƙǅĂ Ü ŎǊƓǃƒ ƒƧǒƤƊĂ ƴƒƧ!ƒ ǊǆǆǅĂ ýĂŪƒ ǊǆǆǅǂǃƓǃƒ ƴƱǀǆ!ƒ ǏǆƵ

. ƴƒƧ!ƒ ƒƧǒƤƊĂ ĂƠƪƙ ǂǃƓǃƒĂ ýĂŪƒ ǊǆǆǅŎǊƓǃƒ



(Ta sal qā Ăǂǂƨǂ)

ꓘǁƑǩǁɛ ƱƲʂƉǅǁɛ			Ĭǆ̇Ƒǩǁɛ ƱƲʂƉǅǁɛ			üǋǓɛ ƱƲʂƉǅǁɛ			
ƍƍƥƗǁɛ	ƔƍƪǁĖ	ƔƍƉǅǁɛ	ƍƍƥƗǁɛ	ƔƍƪǁĖ	ƔƍƉǅǁɛ	ƍƍƥƗǁɛ	ƔƍƪǁĖ	ƔƍƉǅǁɛ	ȟƉǅǂǀǁɛ
150	51	347	197	54	330	155	48	157	Ăʂǂǂƨİ

ƪƥǆǅ̈! ƧȟǉǊ ýĂƱƉ ʂǀơǩŏƽ (Ĭǀǁ̇ƪǩ) ýƶƽ!ƒ ǋǁƛǆǒĂ (ɵ ɵ ƒ + ƒ ɵ ƒ + ɵ ƒ) ƴƪǴǩ!ƒ

ǋŏǁ̈ŏ ŎǈǴƛ!ƒ ƴƱǀǆǅ!ƒ Ĭǁ̇Ƶ ƪƥƬǁ! ƧȟǉǊ ăĂƿƉ ʂǀơǩŏĂ Ü ýĂŪƒ ƒƧŏƤƉĂ ŎǈǴƛ!ƒ ǋŏǁ̈ŏ ƚ!ǴƛƑ ƴƱǀǆǅ!ƒ Ĭǁ̇Ƶ

. ƚ!ǴƛƑ ƒƧŏƤƉĂ ýĂŪƒ ǋŏǁ̈ŏ ŎǈǴƛ!ƒ ƴƱǀǆǅ!ƒ Ĭǁ̇Ƶ ƥƥƧǩǁ! ƧȟǉǊ Ĭǁ̇ƵƉ ʂǀơǩŏĂ Ü ýĂŪƒ ƒƧŏƤƉĂ ƚ!ǴƛƑ

('iq can sa sa ǀƧǂƨǆǉƃɛ)

ƱƓƐƥǁǁƐ ƱƱƨƊǁǁƐ			ƘǁƑǁǁƐ ƱƱƨƊǁǁƐ			ǏǁƑǁǁƐ ƱƱƨƊǁǁƐ			üǋǗƐ ƱƱƨƊǁǁƐ			
ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƕƊǏǂǀǁƐ
153	51	238	168	52	224	196	53	240	152	54	328	ƚƧ ƨǆǇƐ

ƪǀƠƙƼ (Σ ƪǈƶƿƒ) ýƺ!ƒ ǊǁǍǆǒĂ (θ ƒ + θ ƒ + ƒ θ ƒ + ƒ θ ƒ) ƧTƓƺ!ƒ

Ƨǁǈ ăĂƿƊ ƪǀƠƙǒĂ Ü ƚ!ƓǍ!ƒ ƒƧǒƤƊĂ ýǁƒƧ!ƒ ǊǁǒǁǒĂ ŎǈƓǍ!ƒ ǊǁǒǁǒÜ ýĂŪƒ ýƱǀǆ!ƒ ǏǁƵ ǀƥǆǁ! Ƨǁǈ ýĂƱƊ

ƥƥƧƙǁ! Ƨǁǈ ǏǁƵƊ ƪǀƠƙǒĂ Ü ýǁƒƧ!ƒ ƒƧǒƤƊĂ ƚ!ƓǍ!ƒ ǊǁǒǁǒĂ ŎǈƓǍ!ƒ ǊǁǒǁǒÜ ýĂŪƒ ýƱǀǆ!ƒ ǏǁƵ ǀƥTǁ!

. ýĂŪƒ ƒƧǒƤƊĂ ýǁƒƧ!ƒ ǊǁǒǁǒĂ ƚ!ƓǍ!ƒ ǊǁǒǁǒÜ ŎǈƓǍ!ƒ ýƱǀǆ!ƒ ǏǁƵ

('is lan qā ĂƨǆǂƨƐ)

ƘǁƑǁǁƐ ƱƱƨƊǁǁƐ			ǏǁƑǁǁƐ ƱƱƨƊǁǁƐ			üǋǗƐ ƱƱƨƊǁǁƐ			
ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƥƥƧƙ!ƒ	ǀƥT!ƒ	ǀƥǆ!ƒ	ƕƊǏǂǀǁƐ
162	54	381	174	52	429	131	45	217	ĂƨǆǂƨƐ

[illegible] (θ θ f + f θ f + f θ f) [illegible]

[illegible]

[illegible]

[illegible] .

[illegible] :

(Ya ta daḥ ra ǧu [illegible])

[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
208	40	190	112	46	130	162	54	215	136	52	115	136	52	136	[illegible]

: Ɨŏ!Ǧƙ!ƒ ýǦƗTŪƒ ǇǰƋ ǸŏƼ ƥŏƨƌ!ƒ ǑƛǕƛ!ƒ ƳƧǦưƌ!ƒ ýƶƺǃ! ǑƶƱǀƌ!ƒ Ɣŏ+Ƨƙ!ƒ ǇǍ+ƙŏ

(ШƧơƥƙŏ) ýƶƺ!ƒ ǸǃƛƋŏǍ (Ɵ f + Ɵ f + f Ɵ f + Ɵ f + Ɵ f) ýǍŪƒ

Ü ǑǉǦƛ!ƒ ƒƧŏƤǍ ƴǃƒƧ!ƒ ǸŏǃŏǍ ýǍŪƒ ǸŏǃŏǍ ƩƋǦƤ!ƒ ǸŏǃŏǍ Ɨ!Ǧƛ!ƒ ƴƱǀƋ!ƒ Ĭǃƶ ǀƥƋǃ! ƧǃǈǍ ýǍƱƋ ƨǀơƙŏ5

ƒƧŏƤǍ ƴǃƒƧ!ƒ ǸŏǃŏǍ ǍǦƪƙǃ ǑǉǦƛ!ƒǍ ýǍŪƒ ǸŏǃŏǍ Ɨ!Ǧƛ!ƒ ƴƱǀƋ!ƒ Ĭǃƶ ǀƥT! ƧǃǈǍ ăǍƥƋ ƨǀơƙŏǍ

ǍǦƪƙǃ ǑǉǦƛ!ƒǍ ýǍŪƒ ǸŏǃŏǍ Ɨ!Ǧƛ!ƒ ǸŏǃŏǍ ƩƋǦƤ!ƒ ƴƱǀƋ!ƒ Ĭǃƶ ƥƥƧƙ! ƧǃǈǍ ĬǃƶƋ ƨǀơƙŏǍ Ü ƩƋǦƤ!ƒ

. ƴǃƒƧ!ƒ ƒƧŏƤǍ

(Ya ta ğal ba bu ƒǦƗШĭ)

ƧƋƒǀǃǃ ǀǀƨƋǃǃ			ǀǦƥǃǃ ǀǀƨƋǃǃ			ƘǃƒƙǃǃƋ ǀǀƨƋǃǃ			ĬƋƒƙǃǃ ǀǀƨƋǃǃ			üǆǓǃ ǀǀƨƋǃǃ			
ǀǀƥƗǃǃ	ǀǀƪǃǃ	ǀǀƋǃǃ	ǀǀƥƗǃǃ	ǀǀƪǃǃ	ǀǀƋǃǃ	ǀǀƥƗǃǃ	ǀǀƪǃǃ	ǀǀƋǃǃ	ǀǀƥƗǃǃ	ǀǀƪǃǃ	ǀǀƋǃǃ	ǀǀƥƗǃǃ	ǀǀƪǃǃ	ǀǀƋǃǃ	ƕƋƗǃǃ
94	42	182	116	53	154	147	54	262	126	51	188	119	50	244	ƒǦƗШĭ

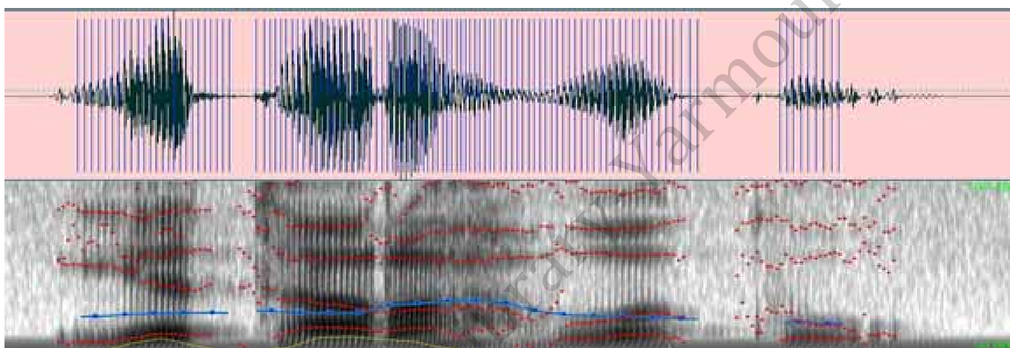
ƽ lơƙő5 (Ɣƕǁƞƙő) ýƶ5!ƒ ǋǁǉǆǆőĂ (θ ƒ + θ ƒ + ƒ θ ƒ + θ ƒ + θ ƒ) ŎǉĜλ!ƒ

Ü yǜƒƧ!ƒ ƒƧőƤǁĂ Ʃ ǆǅĜƤ!ƒ ǋőǁőĂ ŎǉĜλ!ƒ ǋőǁőĂ ýĂŪƒ ǋőǁő ƚ !Ĝλ!ƒ yƱ lǆ!ƒ Ĭ ǁƵ ǉƥǆǁ! Ƨǁǉ ýĂƱǁ

Ü Ʃ ǆǅĜƤ!ƒ ƒƧőƤǁĂ ýĂŪƒ ǋőǁőĂ ŎǉĜλ!ƒ ǋőǁőĂ yǜƒƧ!ƒ ǋőǁő ƚ !Ĝλ!ƒ yƱ lǆ!ƒ Ĭ ǁƵ ǉƥT ǁ! Ƨǁǉ ăĂpǁ ƽ lơƙőĂ

ƒƧőƤǁĂ yǜƒƧ!ƒ ǋőǁőĂ ýĂŪƒ ǋőǁőĂ ŎǉĜλ!ƒ ǋőǁő ƚ !Ĝλ!ƒ yƱ lǆ!ƒ Ĭ ǁƵ ƥƥƧƙǁ! Ƨǁǉ Ĭ ǁƵǁ ƽ lơƙőĂ

. Ʃ ǆǅĜƤ!ƒ



(Ya ta rah wa ku pŇǰǉƥħĭ)

Ƨ ǆǅƑƣǁ ǕƲƨǆǅǁ			ǕĜƥǁ ǕƲƨǆǅǁ			ƘǁƑƙǁ ǕƲƨǆǅǁ			Ĭ ǆǅƑƙǁ ǕƲƨǆǅǁ			üŇǕǁ ǕƲƨǆǅǁ			
ơơƥƚǁ	Ɣơǂǁ	Ɣơǆǅǁ	ơơƥƚǁ	Ɣơǂǁ	Ɣơǆǅǁ	ơơƥƚǁ	Ɣơǂǁ	Ɣơǆǅǁ	ơơƥƚǁ	Ɣơǂǁ	Ɣơǆǅǁ	ơơƥƚǁ	Ɣơǂǁ	Ɣơǆǅǁ	ƕǆǅǂ l ǁ
106	40	204	119	49	241	162	53	253	127	53	195	123	50	209	pŇǰǉƥħĭ

(ǁ ĂŇǰƧƙő) ýƶ5!ƒ ǋǁǉǆǆőĂ (θ ƒ + θ ƒ + ƒ θ ƒ + θ ƒ + θ ƒ) ƚ !Ĝλ!ƒ

Ü ŎǉĜλ!ƒ ƒƧőƤǁĂ Ʃ ǆǅĜƤ!ƒ ǋőǁőĂ ýĂŪƒ ǋőǁőĂ yǜƒƧ!ƒ ǋőǁő ƚ !Ĝλ!ƒ yƱ lǆ!ƒ Ĭ ǁƵ ǉƥǆǁ! Ƨǁǉ ýĂƱǁ ƽ lơƙő5

ƒƧőƤǁĂ yǜƒƧ!ƒ ǋőǁőĂ ýĂŪƒ ǋőǁő ĂĜǂƙǁ ƚ !Ĝλ!ƒĂ ŎǉĜλ!ƒ yƱ lǆ!ƒ Ĭ ǁƵ ǉƥT ǁ! Ƨǁǉ ăĂpǁ ƽ lơƙőĂ

ẙƞƒƧ!ƒ ƝǒǉǒǍ ẙǍǕƒ ƝǒǉǒǍ ǑǇǦ!ƒ ƝǒǉǒǍ ƚ!ǦƦ!ƒ ẙƱǀǆ!ƒ ǏǉƵ ƥƥƧƙǃ! Ƨƕǀ ǏǉƵƉ ƽǀơƙǒǍ Ǖ ƩǆǦƤ!ƒ

. ƩǆǦƤ!ƒ ƒƧǒƤƉǍ

(Ya ta ŝay ṯa nu ǅǕǏƪƞ)

Ƨ ǅǰƣǀǁ ǕǕƽǅǉǁ			ǕǦƐƥǁǁ ǕǕƽǅǉǁ			Ƙǁƒƙǁǁ ǕǕƽǅǉǁ			Ǐǆƒƙǁǁ ǕǕƽǅǉǁ			üǋǓƐ ǕǕƽǅǉǁ		
ǭǭƥƗǁǁ	ƔǭƪǁǁƐ	ƔǭǅǉǁƐ	ǭǭƥƗǁǁ	ƔǭƪǁǁƐ	ƔǭǅǉǁƐ	ǭǭƥƗǁǁ	ƔǭƪǁǁƐ	ƔǭǅǉǁƐ	ǭǭƥƗǁǁ	ƔǭƪǁǁƐ	ƔǭǅǉǁƐ	ǭǭƥƗǁǁ	ƔǭƪǁǁƐ	ƔǭǅǉǁƐ	ƕǅƗǀǁǁ
115	42	188	125	47	162	160	47	341	122	46	123	117	45	177	ǅǕǏƪƞ

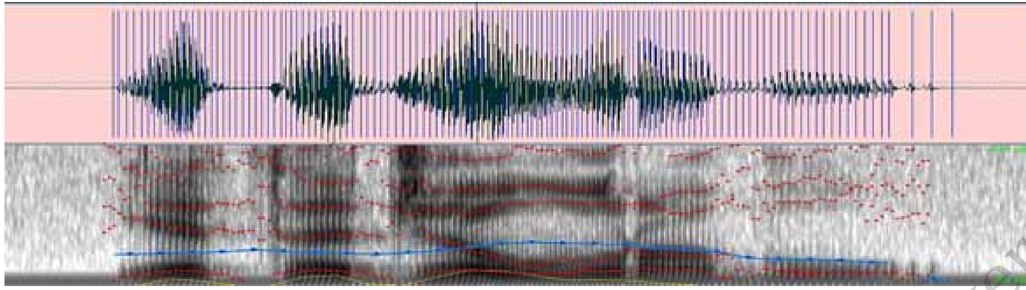
(ǈƱǒƬƙǒ) ẙƶƺ!ƒ ƝǉƛǆǒǍ (Ɵ ƒ + Ɵ ƒ + ƒ Ɵ ƒ + Ɵ ƒ + Ɵ ƒ) ẙƞƒƧ!ƒ

Ǖ ǑǇǦ!ƒ ƒƧǒƤƉǍ ẙƞƒƧ!ƒ ƝǒǉǒǍ ẙǍǕƒ ƝǒǉǒǍ ƩǆǦƤ!ƒ ƝǒǉǒǍ ƚ!ǦƦ!ƒ ẙƱǀǆ!ƒ ǏǉƵ ǀƥǆǁ! Ƨƕǀ ẙǍƱƉ ƽǀơƙǒ5

ƒƧǒƤƉǍ ẙǍǕƒ ƝǒǉǒǍ ǑǇǦ!ƒ ƝǒǉǒǍ Ǖ ǍǦƪƙƕ ẙƞƒƧ!ƒǍ ƚ!ǦƦ!ƒ ẙƱǀǆ!ƒ ǏǉƵ ǀƥƬǉ! Ƨƕǀ ǎǍƿƉ ƽǀơƙǒǍ

ẙǍǕƒ ƝǒǉǒǍ ǑǇǦ!ƒ ƝǒǉǒǍ ẙƞƒƧ!ƒ ƝǒǉǒǍ ƚ!ǦƦ!ƒ ẙƱǀǆ!ƒ ǏǉƵ ƥƥƧƙǃ! Ƨƕǀ ǏǉƵƉ ƽǀơƙǒǍ Ǖ ƩǆǦƤ!ƒ

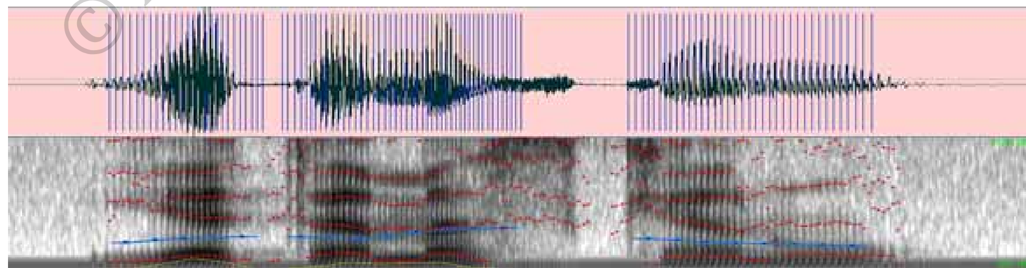
. ƩǆǦƤ!ƒ ƒƧǒƤƉǍ



(Ya ta ğaw ra bu [illegible])

[illegible]			[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
102	45	210	114	53	154	158	55	333	126	53	150	124	50	202	[illegible]

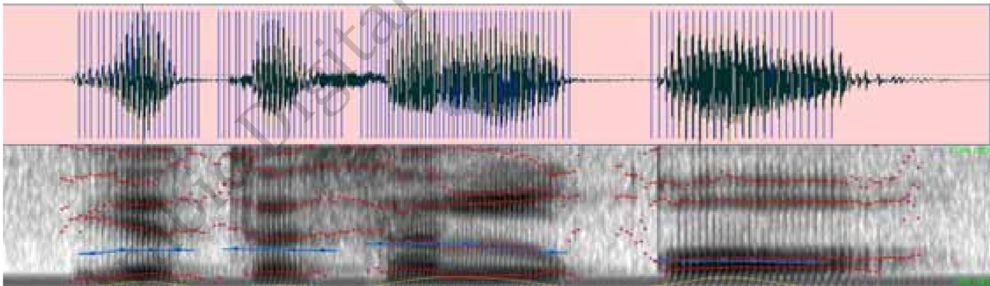
[illegible]



(Ya ta mas ka nu [illegible])

ƧDžƑƢǁ ƲƯƨDžǁ			ƲƓƀǁ ƲƯƨDžǁ			ƘǁƑǩǁ ƲƯƨDžǁ			ǏǆƑǩǁ ƲƯƨDžǁ			üǊǗ ƲƯƨDžǁ			
ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƅDžǂǀǁ
103	44	247	117	47	157	179	50	311	129	50	182	122	49	233	DžǀƨDžǐ

(ǇǂƪǆǨǒ) ýƸƼ!ƒ ǋǁǅǆǒĂ (ɵ f + ɵ f + f ɵ f + ɵ f + ɵ f) ƩƀƓƪ!ƒ Ü yǘƒƧ!ƒ ƒƧǒƤƊĂ ǑǉƓƛ!ƒ ǋǒǁǒĂ ýĂǕƒ ǋǒǁǒĂ ƩǆƓƤ!ƒ ǋǒǁǒ ƚ!ƓƛƒĂ yƱǀǆ!ƒ ǏǁƵ ǀƀǆǁ! ƧǀǊ ýĂƱƊ ƨǀơǩǒ5 ƒƧǒƤƊĂ yǘƒƧ!ƒ ǋǒǁǒĂ ýĂǕƒ ǋǒǁǒ ĂƓƪǩ ƚ!ƓƛƒĂ ǑǉƓƛ!ƒ yƱǀǆ!ƒ ǏǁƵ ǀƤǁ! ƧǀǊ ăĂƿƊ ƨǀơǩǒĂ yǘƒƧ!ƒ ǋǒǁǒĂ ýĂǕƒ ǋǒǁǒĂ ǑǉƓƛ!ƒ ǋǒǁǒ ƚ!ƓƛƒĂ yƱǀǆ!ƒ ǏǁƵ ƀƀƧǩǁ! ƧǀǊ ǏǁƵƊ ƨǀơǩǒĂ Ü ƩǆƓƤ!ƒ ƒƧǒƤƊĂ .



(Ya ta sal qā ĂƨǂƨƚǏ)

ƲƓƀǁ ƲƯƨDžǁ			ƘǁƑǩǁ ƲƯƨDžǁ			ǏǆƑǩǁ ƲƯƨDžǁ			üǊǗ ƲƯƨDžǁ			
ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƣƣƅǂǁ	ƔƣƪǁƐ	ƔƣDžǁ	ƅDžǂǀǁ
123	37	281	132	47	330	133	45	157	136	52	261	ĂƨǂƨƚǏ

ýĂƱŊ ʦ lơƙŏ5 (Ǐ lǏ ʅ ƙŏ) ýƶ5!ƒ ŊǏĂdžŏĂ (ɵ ɵ ƒ + ƒ ɵ ƒ + ɵ ƒ + ɵ ƒ) yǏǴ ʅ !ƒ

lƥTǏ! ƧǏǰ ăĂpŊ ʦ lơƙŏĂ Ü ƚ !Ǵƛ!ƒ ƒƧŏƤŊĂ ýĂǕƒ ŊǏŏĂ yǏƒƧ!ƒ ŊǏŏ ƚ !Ǵƛ!ƒ yƱ ldž!ƒ Ǐ Ǐ Ƶ lƥdžǏ! ƧǏǰ

yƱ ldž!ƒ Ǐ Ǐ Ƶ ƥƥƧƙǏ! ƧǏǰ Ǐ Ǐ ƵŊ ʦ lơƙŏĂ Ü yǏƒƧ!ƒ ƒƧŏƤŊĂ ŎǈǴƛ!ƒ ŊǏŏĂ ƚ !Ǵƛ!ƒ ŊǏŏ ýĂǕƒ yƱ ldž!ƒ Ǐ Ǐ Ƶ

. yǏƒƧ!ƒ ƒƧŏƤŊĂ ƚ !Ǵƛ!ƒ ŊǏŏĂ ŎǈǴƛ!ƒ ŊǏŏ ýĂǕƒ

(Yaḥ ran ǧi mu !ǕǏƥƟǏ)

ƱǴƐƥǏƐ ƱƱʦDžǏƐ			ƘǏƑƙǏƐ ƱƱʦDžǏƐ			Ǐ ǏƑƙǏƐ ƱƱʦDžǏƐ			üǊǕƐ ƱƱʦDžǏƐ			
ƣƣƥƚǏƐ	ƔƣʅǏƐ	ƔƣDžǏƐ	ƣƣƥƚǏƐ	ƔƣʅǏƐ	ƔƣDžǏƐ	ƣƣƥƚǏƐ	ƔƣʅǏƐ	ƔƣDžǏƐ	ƣƣƥƚǏƐ	ƔƣʅǏƐ	ƔƣDžǏƐ	ƕDžǂǀǏƐ
107	48	214	123	50	226	162	53	280	133	49	301	!ǕǏƥƟǏ

ʦ lơƙŏ5 (DžƞǈƧơŏ) ýƶ5!ƒ ŊǏĂdžŏĂ (ɵ ƒ + ɵ ƒ + ƒ ɵ ƒ + ƒ ɵ ƒ) LJdžǴƛ!ƒ

ƧǏǰ ăĂpŊ ʦ lơƙŏĂ Ü yǏƒƧ!ƒ ƒƧŏƤŊĂ ƚ !Ǵƛ!ƒ ŊǏŏĂ ŎǈǴƛ!ƒ ŊǏŏ ýĂǕƒ yƱ ldž!ƒ Ǐ Ǐ Ƶ lƥdžǏ! ƧǏǰ ýĂƱŊ

Ǐ Ǐ Ƶ ƥƥƧƙǏ! ƧǏǰ Ǐ Ǐ ƵŊ ʦ lơƙŏĂ Ü yǏƒƧ!ƒ ƒƧŏƤŊĂ ýĂǕƒ ŊǏŏĂ ƚ !Ǵƛ!ƒ ŊǏŏ ŎǈǴƛ!ƒ yƱ ldž!ƒ Ǐ Ǐ Ƶ lƥTǏ!

. yǏƒƧ!ƒ ƒƧŏƤŊĂ ƚ !Ǵƛ!ƒ ŊǏŏĂ ýĂǕƒ ŊǏŏ ŎǈǴƛ!ƒ yƱ ldž!ƒ

(Yaq ŝa cir ru [illegible])

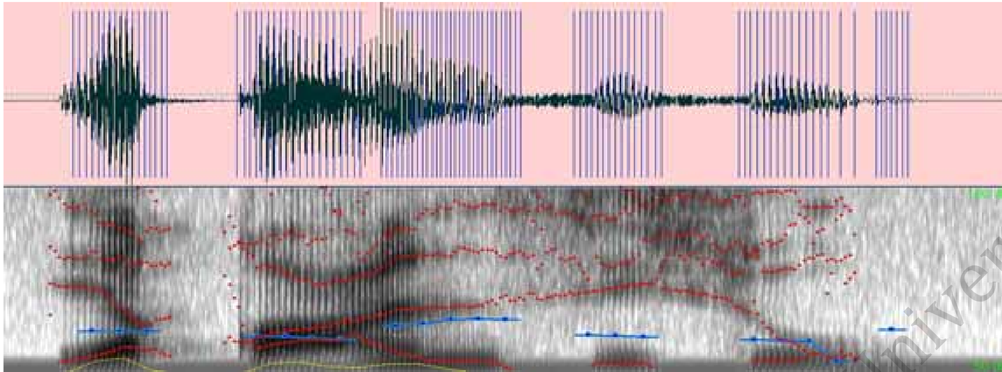
[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
98	45	232	146	54	385	133	52	165	136	51	282	[illegible]

[illegible] ([illegible]) [illegible] (θ f + f θ f + θ f + f θ f) [illegible]

[illegible]

[illegible]

. [illegible]



(Yaq can si su [illegible])

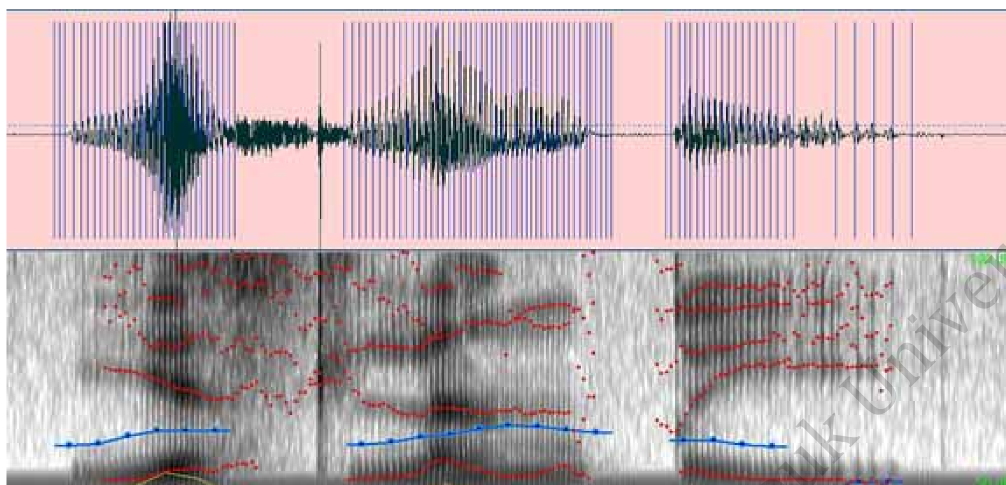
[illegible]			[illegible]			[illegible]			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
99	43	233	111	44	226	151	51	347	105	51	364	[illegible]

[illegible] ([illegible]) [illegible] (θ f + θ f + f θ f + f θ f) [illegible]

[illegible]

[illegible]

. [illegible]



(Yas lan qĪ Ĭƨŭǂǂƨĭ)

ƘǁƑƙǁƐ ƲƲƨƊŽǁƐ			ĬǆƑƙǁƐ ƲƲƨƊŽǁƐ			üǸŬƐ ƲƲƨƊŽǁƐ			
ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƥƥƧƙ!ƒ	ƖƥT!ƒ	Ɩƥǆ!ƒ	ƕƊŽǂǀǁƐ
118	43	237	153	52	425	136	51	334	Ĭƨŭǂǂƨĭ

ýĂƱƉ ƨlơƙŏ5 (ǑǀǉǀƖŏ) ýƶƽ!ƒ ǊǀƛǆŏĂ (Ɵ Ɵ ƒ + ƒ Ɵ ƒ + ƒ Ɵ ƒ) ƧTƵ ĭƥƓơ!ƒ

ƴƱǀǆ!ƒ ĬǀƵ ƖƥTǀ! Ƨƕǉ ăĂƿƉ ƨlơƙŏĂ Ü ýĂǕƒ ƒƧŏƤƉĂ ƚ!ƓƛƒǊǀŏǀŏ ǑǉƓƛ!ƒ ƴƱǀǆ!ƒ ĬǀƵ Ɩƥǆǀ! Ƨƕǉ

ýĂǕƒ ǊǀŏǀŏǑǉƓƛ!ƒ ƴƱǀǆ!ƒ ĬǀƵ ƥƥƧƙǀ! Ƨƕǉ ĬǀƵƉ ƨlơƙŏĂ Ü ƚ!Ɠƛ!ƒ ƒƧŏƤƉĂ ýĂǕƒ ǊǀŏǀŏǑǉƓƛ!ƒ

. ƚ!Ɠƛ!ƒ ƒƧŏƤƉĂ

LJĂƧǀdž!ƒ Ƶ ŏƨǁ!ƒ Ŏǖǖǖ!ƒ (Ʊ

: Ăǁǁ ! ƨšĭǋ Ĭ YƑǴƥǁǁ üyƵǁǁ : ŰǋǇ

ýĂŰƒ ƨĂdžǌdž!ƒ ŎƵǴƨ!ƒ (ǁ

Ʊʅ Ă!ƒ ƨĂdžǌdž!ƒ ŎƵǴƨ!ƒ (Ɣ

ƧƤŬƒ ƨĂdžǌdž!ƒ ŎƵǴƨ!ƒ (Ɯ

Ƶ ƶ ư dž!ƒ ŎƵǴƨ!ƒ (ƥ

ýǴdž!ƒ ŎƵǴƨ!ƒ (ùǋ

Ƶ ĂƞŰƒ ŎƵǴƨ!ƒ (Ă

ƒ pǴǉ!ƒ ŎƵǴƨ!ƒ (ƨ

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